AFIT/GCA/LSQ/92S-7

DEVELOPMENT OF A UNIT COST MODEL FOR THE AFIT PCE PROGRAM

THESIS

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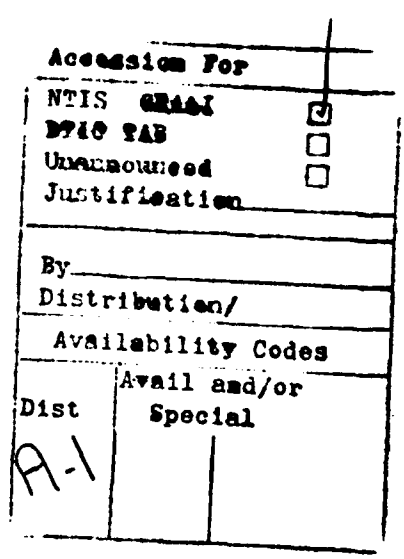

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DEVELOPMENT OF A UNIT COST MODEL FOR THE AFIT PCE PROGRAM

THESIS

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Cost Analysis

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Preface

The purpose of this thesis is to develop a unit cost model for the Professional Continuing Education program within AFIT's School of Systems and Logistics. This model will be used primarily at the beginning of each planning cycle to determine the rate to charge customers for courses provided in the coming fiscal year. This model could also be used at the end of the fiscal year to compare the actual cost of providing courses with the planned cost.

In completing this research many people provided invaluable assistance without which this project would never have been possible. We would like to thank Mr. Ray McCarthy for providing access to the necessary financial data and spending a great deal of time fulfilling our needs and answering questions. We also need to thank our thesis advisors, Mr. Jeff Daneman and Major Wendell P. Simpson, for consistently providing the guidance and direction that this research required. Unfortunately, it is not possible in this document to adequately thank my wife, Nancy Walton, and children, Tommy and Richard, for their wondrous patience. Let it be known, though, that this project could not have been completed without their love.

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Table of Contents

List of Figures

List of Tables

Abstract

This research focused on the development of a unit cost model for the Professional Continuing Education (PCE) program within the Air Force Institute of Technology's School of Systems and Logistics (AFIT/LS). The methodology employed follows that issued in the Unit Cost Resourcing Guidance developed by DoD and was limited to utilizing the accounting structure already in place.

This model can be used primarily at the beginning of each planning cycle to determine the rate to charge customers for courses provided in the coming fiscal year. This model could also be used at the end of the fiscal year to compare the actual cost of providing courses with the planned cost.

DEVELOPMENT OF A UNIT COST MODEL FOR THE AFIT PCE PROGRAM

I. Introduction

General Issue

In 1988, President Ronald Reagan signed Presidential Directive 12637 requiring federal agencies to increase efficiency and cut costs. In order to accomplish this, all government agencies were required to align costs with outputs and set productivity goals (18:10). In an August 1989 memorandum, Mr. Donald Shycoff, Principal Deputy Comptroller of the Department of Defense, established the concept of unit costing as the principal means by which DoD would meet President Reagan's objective of reducing costs (6:14). Guidance for the implementation of unit cost resourcing was issued in October 1990 by Mr. Shycoff. Based upon this guidance, the Secretary of the Air Force directed support organizations to begin developing the mechanisms which would charge customers for work performed on a unit cost basis (6:14).

The primary purpose behind the unit cost concept is to reduce costs by highlighting the "true" cost of the services provided by support organizations (18:10). By highlighting the true cost of services, support organizations can better analyze the cost of providing these services and find ways

to reduce costs (18:11). Unit cost resourcing is intended to serve as a basis for allocating resources for services. Organizations requesting services would be charged for the cost of each unit of service requested. When actually charged for services, provided organizations will begin to conserve those services by searching out alternatives or scaling back the amount of services requested (6:15). Under the unit cost resourcing concept, organizational budgets will be changed to reflect reimbursements to and from other organizations for services provided (18:10). Support organizations will face price competition from the private sector and other military organizations for the services they provide. Those organizations that cannot offer services at a competitive rate stand to lose money in the short-run and perhaps even cease to exist in the long-run.

Background

The Air Force Institute of Technology (AFIT) serves as manager of the Air Force's advanced education programs. In addition to resident master's programs, AFIT oversees a civilian institution program for master's and doctoral work and the Professional Continuing Education (PCE) Program. AFIT's mission is to "support national defense through graduate and professional education and research programs" (2:2).

The School of Systems and Logistics (AFIT/LS) offers graduate programs leading to the Master of Science degree in

acquisition and logistics management related fields such as cost analysis, contract management, and systems management. AFIT's PCE program consists of more than 60 courses intended to meet the immediate education needs of the Air Force and the DoD acquisition and logistics communities (4:1). Courses are attended by more than 7,000 students annually, and the intent of these courses is to establish a framework to meet the increasing educational needs of a dynamic environment. The courses offered in the PCE program have been requested by various DoD agencies as a method of upgrading the skills needed in the work place. Although these courses do not usually result in degrees they can sometimes be used as credit toward degree granting programs.

As a support organization, AFIT will need to develop a system to account for and charge costs to customers. Such charges might be for individual students, specific courses, or even entire degree granting programs. Fees must be competitive with civilian and military educational institutions offering the same or similar courses.

Purpose Statement

The purpose of this thesis is to develop a unit cost model for the Professional Continuing Education program within AFIT's School of Systems and Logistics. This model will be used primarily at the beginning of each planning cycle to determine the rate to charge customers for courses provided in the coming fiscal year. This model could also

and permanent change of station expenses (8:14-15). BOS

be used at the end of the fiscal year to compare the actual cost of providing courses with the planned cost in order to assess management efficiency and effectiveness.

Research Objectives

In order to develop a unit cost model, the following areas will be examined: current DoD guidance on unit costing; existing cost models and the methodologies within them; and the courses and tasks involved in offering the PCE program as well as the costs associated with these courses. More specifically:

1. Current guidance must be examined to determine what costs are appropriate for use in determining unit cost.

2. Existing cost models must be examined for relevance and methodology.

3. The functions and taskings of the PCE program must be fully understood.

Once the above objectives are met, a working unit cost model can be built. The ideal model must: 1) be consistent with DoD policies for unit costing; 2) utilize current accounting and reporting systems; and, 3) be capable of being used within the existing budget process.

Scope/Limitations

This thesis is limited to the development of a unit cost model following DoD guidance. As such, this thesis will not explore alternative methods of determining costs.

This model is further limited to the needs and requirements of AFIT's School of Systems and Logistics Professional Continuing Education program. Only the costs of the resources required to offer the PCE program will be considered within the model. Costs incurred solely by the user/customer will not be considered (e.g. student TDY costs).

DoD guidance and existing cost models will be used to provide a baseline of methodology for the PCE unit cost model. Current DoD guidance and USAF guidance will be used to determine the types of costs that can be charged to the user through unit cost resourcing. Existing guidance includes: Unit Cost Resourcing Guidance; the Defense Business Operations Fund (DBOF) Implementation Plan; and, a drafted Implementation Plan, Fee-For-Service for Air University Professional Continuing Education.

Existing models will be examined for the methodology used and the appropriateness of data collected. These models include two AFIT research studies, a DoD model, and an AFIT report. Cox and Hotcaveg's thesis, A Cost Model for Air Force Institute of Technology Programs, focuses on developing a cost model for all AFIT programs, while Haynes and Williamson's thesis, A Cost Analysis of Graduate Education in Logistics Management, compares costs of an AFIT graduate education versus the cost of a similar degree at a civilian university. The Acquisition Enhancement (ACE) Model calculates reimbursement costs for ACE courses, and

the Training Course Cost Report (TCCR) is an annual report prepared by AFIT for Air University which details the costs of providing training courses.

This thesis is limited in that existing guidance is in a state of flux. Complete formal guidance has not been issued regarding the full scope of the unit cost resourcing policy.

Overview

The remainder of this thesis is divided into four chapters. Chapter 2 reviews existing literature on unit costing, guidance for fee-for-service charges from DoD implementation plans, and the rationale and factors considered in existing cost models. Chapter 3 discusses the methodology used in gathering the data and developing the factors for development of the cost model. Chapter 4 details the development of the cost model, and finally, Chapter 5 summarizes the results and findings and provides recommendations for further refinement of the model.

II. Literature Review

Overview

This literature review is separated into four different sections. Section one examines literature relevant to understanding the concept of unit costing as it applies to the DoD environment. The second section focuses on DoD guidance for the implementation of unit cost charges. The third section examines existing cost models for education and training. This third section is separated into two parts--part one reviews DoD-specific education and training cost models and their methodologies; part two presents models which have been developed outside the DoD, primarily for the use of undergraduate institutions. The final section is a summary of the findings.

Unit Costing

Simply put, the development of unit cost involves dividing the total cost of an activity by the total number of units of output generated by that activity. The result, referred to as the unit cost, is the average cost of production of one unit. In theory, tying all costs directly to units of real output through unit cost analysis helps reduce the overall cost of doing business by making costs and productivity changes more visible to managers and decision makers. Decisions to cut costs can then be measured not just in bottom line dollars, but by the effect

a change in the bottom line dollars has on individual unit costs and overall productivity. Likewise, investment decisions can focus on the expected change in the average unit cost rather than on "bells and whistles." Managers should then be better able to make decisions on investments and cost cutting initiatives and be held directly accountable for those decisions (11:17).

In 1988, in an effort to accomplish the goal of reducing costs and increasing productivity, President Reagan issued Presidential Directive 12637 requiring all federal agencies to align costs with outputs (17). The Principal Deputy Comptroller of the Department of Defense then issued a memorandum implementing DoD-wide cost per unit output systems within several major functional areas of DoD (18:10). And so unit costing came into being for the Air Force. The initial functional areas required to implement unit costing included Supply Operations, Training, Recruiting, Commissaries, and Health Care. Functions like Research and Development, Accounting and Finance, and other support functions were to be part of the second wave of implementation, with an eye toward eventually applying unit costing to all Air Force functions, particularly the support functions (6:14).

The DoD policy that ultimately evolved from President Reagan's directive took the concept of unit cost one step further than simple analysis of costs and productivity. The DoD decided that unit cost could be used as a partial basis

for future budget decisions--unit cost resourcing. It was determined that budgets could be derived simply by multiplying the average unit cost by the expected number of units to be produced. In the DoD world of limited funding, unit costing could then serve as the basis for reimbursement from, or "charges" to, the end users of the support products (18:10).

The key to proper use of unit cost data is in the derivation of unit cost. According to James S. Blandin and Francois Melese in Resources, Productivity, and Unit Costs, there are six basic steps required to develop a unit cost system:

> 1. The identification and physical measurement of organizational outputs (goods/services).
> 2. The identification and measurement of the labor, capital, material and other resource inputs used in the production process.
> 3. The identification of input/output relationships that reveal alternate combinations of inputs capable of producing a given level and quality of output.
> 4. The costing out (cost accounting) of each unit of input (labor, capital, etc.).
> 5. The calculation of total costs associated with a specific level of output which is accomplished by aggregating current levels of resource usage by the cost of each input.
> 6. Finally, dividing total cost by a specified level of output yields unit cost, or "cost per output." (7:2-3)

On the surface, unit cost resourcing sounds like a reasonable approach to reducing costs, planning future investments, making budgets, and charging customers. There are, however, some problems inherent within the unit costing philosophy. Some of these problems are theoretical in nature and some are DoD-specific problems.

When an organization operates in a production environment, outputs are easily distinguishable and quantifiable. Organizations in a service environment may not be able to distinguish outputs quite as easily. If units of production are identifiable and accounting systems are comprehensive enough to separate and allocate complete costs to activities, the derivation of unit cost seems straight forward in that Blandin's six steps are easily achieved (7:6). The average unit cost is then a useful tool for making investment decisions. Charges to users can be easily calculated and passed on, and budgeting is straight forward (7:9).

Organizations, however, face a dynamic environment; demand, and therefore production, fluctuate. Fixed costs are allocated across all production units using some common basis like direct labor hours. In the short run when demand (output) changes these same fixed costs are allocated across a different number of production units artificially changing the cost of each unit. If production is increasing, the unit cost declines; if production decreases, unit cost increases. Clearly, there has been no change in fixed cost to the organization, only a change in the allocation of those costs (11:21).

As a result, when unit costs are used as a budgeting and reimbursement tool without regard to changing demand, organizations can be over or under-funded. Initial budget estimates are based upon some past cost and a prediction of

future output. This allows for development of one specific reimbursement rate for each unit of production. When demand turns out to be less than anticipated, actual reimbursements received by the organization may not cover the total costs of production. Figure 1 shows an organization with a planned output of 30 units. The unit cost charge for that output would be $250K. If the organization actually produces only 20 units, reimbursements will only be $5M (20 units at $250K each). In this example it actually costs $350K per unit to produce 20 units. The organization has been under-funded by $2M ($7M it costs to produce 20 units minus the $5M in reimburesements). This same organization can be over-funded as shown in Figure 2. Suppose 40 units are produced instead of the planned 30. Reimbursements will be $10M (40 units at $250K each). Each unit actually costs the organization only $220K to produce. The organization will have been over-funded by $1.2M.

In competitive industry, firms are said to operate at some economically efficient production point, specifically that point where average total cost is at its minimum. At all other points on the curve average cost is higher. If funding is based upon production at the minimum average unit cost but actual demand is at any other point, the organization will be under-funded (7:13). In other words, efficient organizations will inherently be under-funded whenever actual demand and the economically efficient production point are not the same.

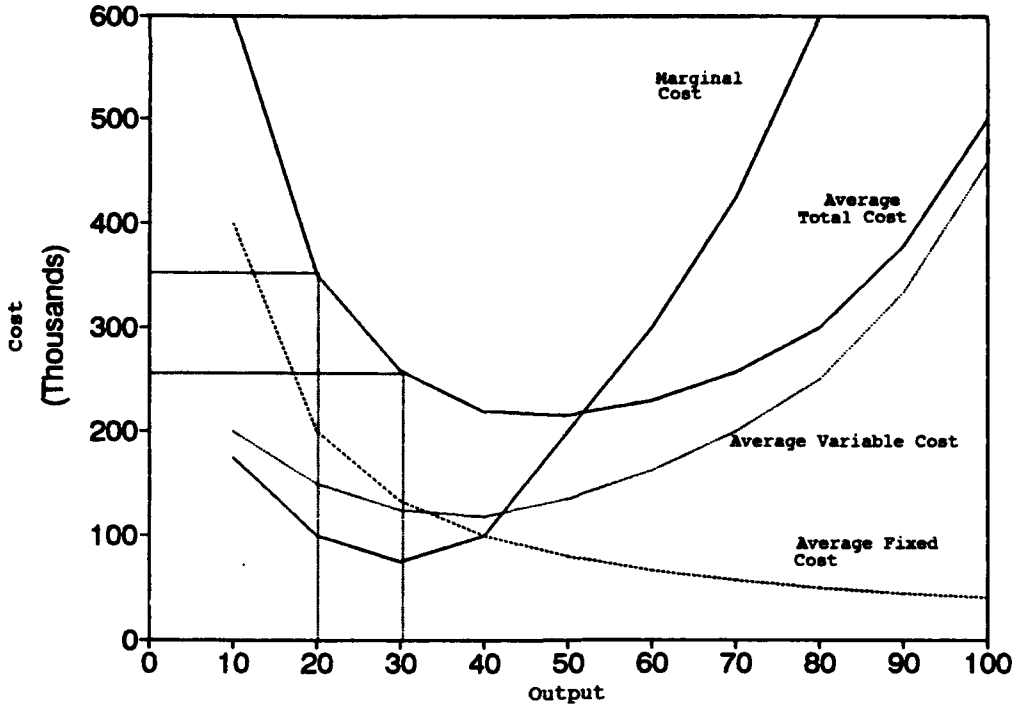

Figure 1. Under-funded Organization

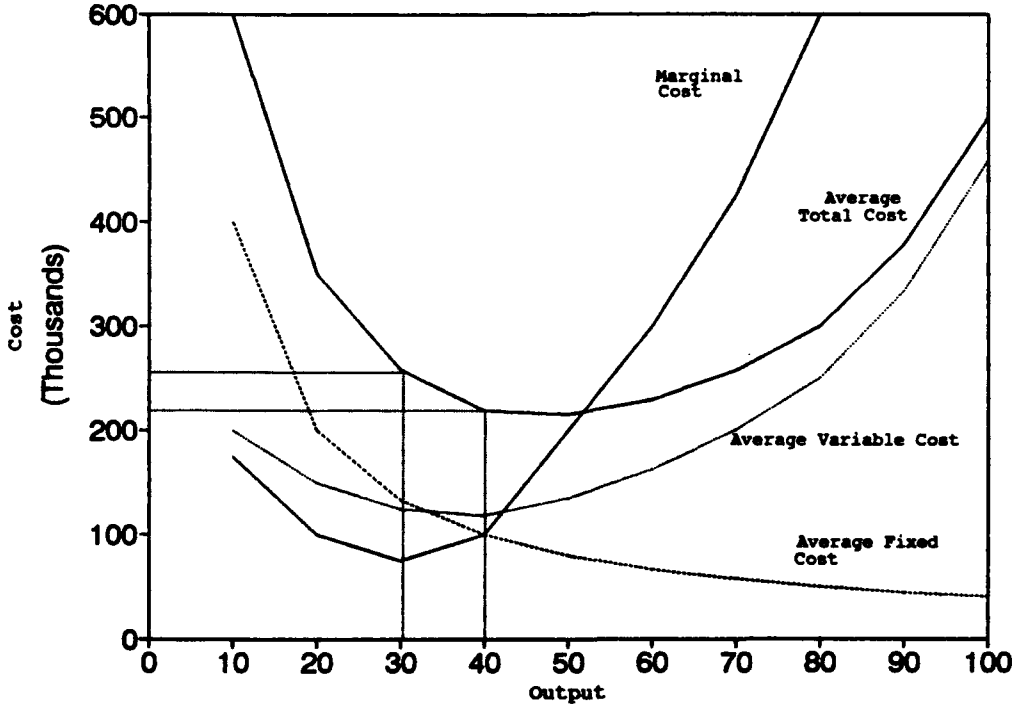

Figure 2. Over-funded Organization

In summary, unit costing is intended as a tool to be used to help make resource allocation decisions. In a stable environment it can succeed. In rapidly changing environments, however, decisions made solely on past average unit costs without regard to changing production and environmental circumstances may lead to poor allocation decisions.

DoD and USAF Guidance

Neither DoD nor the USAF have fully completed regulatory guidance on procedures to implement unit costing. This is due primarily to a phased implementation of the requirement to begin using unit costing. Some organizations are already using unit costing concepts; some will move to unit costing as systems and procedures are developed. The Defense Business Operations Fund (DBOF) Implementation Plan Report provides the framework for overall implementation of the unit costing concept. Included in the DBOF implementation plan are the business areas of: supply management, distribution depots, depot maintenance, base support, transportation, research and development activities, printing and publication services, information services, Defense Commissary Agency, Defense Finance and Accounting Services, Defense Clothing Factory, Defense Technical Information Center, Defense Reutilization and Marketing Service, and Defense Industrial Plant Equipment Center (10:3). Training is not currently included under DBOF.

DBOF is intended to allow the DoD "expand the use of businesslike financial management practices" (10:1). The primary goals are to consolidate functions, increase cost visibility, and save money through better business practices. In terms of funding, DBOF is intended to be a revolving fund with charges made to the end users replenishing operating funds (10:3). Business areas to be included under DBOF must meet three criteria: 1) be able to identify specific products or services provided; 2) have a cost accounting system capable of collecting costs of the specific outputs; and 3) have readily identifiable customers for the product/services provided (10:5).

Reimbursements under DBOF are based upon "the cost of the actual workload that comes through the door" (10:7). This cost is derived from unit cost data. Included in the unit cost data are factors for real property maintenance, mobilization and surge costs, military personnel costs, and "full recovery of costs" (10:7-10). Full recovery of costs includes both direct costs (supplies and materials) and indirect costs (overhead).

Because Air University (AU) is not currently included under DBOF, AU has drafted its own plan for the professional continuing education program, the Implementation Plan, Fee-For-Service (FFS) for Air University Professional Continuing Education Plan. The AU draft is proposed for use by all PCE organizations under AU and calls for a test period during FY 93 with full implementation during FY 94 (5:2). AU assumes

class size and course demand will remain stable. Courses that do not attain at least 70 percent scheduled attendance during the planning phase will be dropped from curriculums.

Under the draft AU plan, users reimburse the PCE program for the costs incurred for courses taught. Reimbursements are made based upon quotas rather than actual attendance. Fee-for-services differs from DBOF in that reimbursable fees are limited to "direct costs for field trips, guest speakers, curriculum development, registration fees, contract professors, book subscriptions, textbooks and a percentage of supply and equipment costs" (5:4). As stated in the plan, "the full course costs (as would be required under the DBOF concept) will not pass to the user at this time in order to maintain required infrastructure of the schools" (5:4). Student TDY costs are incurred by the user. (It should be noted that at the time this research was completed AU had not officially adopted the fee-for-service plan. As mentioned earlier, training and education were identified as a functional area to be included under unit cost resourcing (UCR)--described in detail below. AU attempted to adopt the plan described above in place of UCR, but as of this writing AU is still projected to operate under a UCR philosophy in FY 93.)

General DoD guidance for unit resource costing as well as the philosophy for unit costing is contained in Unit Cost Resourcing Guidance (UCRG). "The unit cost, or cost per output, concept is that all costs incurred at an activity,

or within a function, should be related to an output of the activity" (8:2). The unit cost approach allows management to look at all costs in terms of output (8:2). Costs are grouped into three categories: direct costs, indirect costs, and general and administrative (G&A) expenses (8:7-8). Direct costs are those cost associated with any one specific output; indirect costs are costs associated with two or more outputs but not all output; G&A expenses are essentially overhead costs associated with all outputs (8:7-8). G&A expenses will be allocated based upon the personnel assigned to the activity (8:16). The unit cost is derived by adding the appropriate categories of costs together for each unit of output.

It is intended that unit cost, or "earnings", will serve as the baseline for evaluating and funding the budgets for organizations (8:9). Within the guidance, it is recognized that the strict application of unit costing may result in the over-funding or under-funding of organizations (8:10). This is because the fixed costs are allocated across a set number of production units. Until such time as fixed and variable costs can be better differentiated, however, earnings will be based upon full unit costs (8:9).

The UCRG provides guidance on the treatment of specific costs, including military manpower expenses, base operating support (BOS), and depreciation. Military manpower costs will be calculated using pay factors that include basic pay, retirement accrual, allowances, special pay, incentive pay,

and permanent change of station expenses (8:14-15). BOS charges will be treated as G&A expenses (8:8). Depreciation expenses will be charged on investment items in excess of $15,000 (8:11-14). Depreciation will be calculated on investment costs minus residual value using straight-line depreciation methods.

Existing Models

DoD Models. The search for applicable research relating to models and their methodologies for the education and training environment is indeed a challenge. In a 1988 study, the Training and Performance Data Center reviewed 35 financial models dealing with estimating and modeling DoD training costs (16). The study revealed that even though the models were intended for estimating training costs, most were primarily developed to account for and track other types of costs. The study goes on to state, "Most of the models focused on the acquisition of weapon systems, life-cycle support, and strategic planning, and considered training costing as a subordinate function" (16:25). In an earlier study by the Navy Personnel Research Development Center, similar conclusions were made. "Numerous cost studies and/or models are available, but each has shortcomings in the areas of training system cost assessment and comparison" (19:44).

Cox and Hotcaveg Model. Two studies which did extensively address the costs in an educational environment

modeled the costs associated with graduate and continuing education at AFIT. In 1979, a cost model for AFIT programs was developed by Cox and Hotcaveg (9). This model was created to "identify, allocate and forecast" the costs associated with operating all the schools and functions of AFIT (9:12).

Cox and Hotcaveg modeled the full cost of AFIT programs by dividing the costs into direct, indirect and other costs. The direct costs were those which were openly traceable to a cost center, while the indirect portion was defined as those costs that are applicable to several, if not all, cost centers. The "other" category was created to identify the pay and allowances of those students who are enrolled in one of the full-time graduate programs. This provided the user the option of omitting this large portion of the total cost.

At the aggregate level Cox and Hotcaveg separated costs to "cost objectives" within each school, and then broke these costs down into components or "cost categories." Costs were collected at this level and then allocated to the cost objectives. The authors allocated indirect costs based upon the amount of "benefit" received from each cost objective. For example, base support costs were allocated to AFIT based upon the ratio of personnel assigned to AFIT versus the total number of personnel assigned to Wright-Patterson. These costs were then allocated across the schools and finally to the cost objectives. The only exception to this were the civil engineering costs which were based upon square footage occupied.

Partitioning the model into its basic cost components (direct, indirect, and other) and cost structures (cost objectives and cost categories) allows the user to tailor the model to their particular need. As Cox and Hotcaveg state, "Depending on the particular requirement of the person . . . various cost components can be deleted if less than a full cost profile is needed" (9:139).

Haynes and Williamson Model. A similar study was conducted by Haynes and Williamson (13). Their research focused on comparing the cost of an AFIT master's degree in Logistics Management to the cost of a similar degree at a civilian university (13:13). Although a large portion of the research concentrates on a comparison of the course content itself, a full cost approach is developed and an average cost per graduate serves as the basis for their comparison.

Their study separated program costs into direct, indirect, and pay and allowances (13:19). This method was adopted to facilitate a "better comparison of the resident to the CI [Civilian Institute] programs because the comparable elements of cost for each can then be grouped and analyzed independently" (13:19). The CI programs send students to civilian universities for graduate work not offered at AFIT. Within each of these three categories, Haynes and Williamson identified the "elements of cost" attributable to them.

The allocation of the cost elements was similar to the methodology used by Cox and Hotcaveg. Each element common to the entire base population was first allocated to AFIT, then a proportion to AFIT/LS, further allocated to the graduate program, and then finally to the Logistics Management program. The majority of these allocations were made on the basis of personnel assigned to each area. As in the Cox and Hotcaveg thesis, the only exceptions were the base civil engineering costs which were allocated on the basis of square footage (13:89).

Acquisition Enhancement (ACE) Model. In addition to educational development courses, the DoD also provides a structured sequence of courses exclusively for personnel involved with the acquisition of weapon systems. Known as the Acquisition Enhancement (ACE) program, its goal is to enhance professionalism and increase efficiency within the acquisition work force (14:4). The term acquisition as used here includes all contracting, logistics, program management, systems engineering, and production and management personnel (14:3). The Defense Systems Management College (DSMC) serves as the facilitator of the ACE program acting as "the full-time Office of the Secretary of Defense (OSD) action agent to work with the Services and Agencies in accomplishing the needed improvements to the training of acquisition personnel" (16:13). Responsibility for teaching the mandatory courses will remain within the existing educational structure comprised of 13 locations including AFIT.

ACE courses are funded apart from the other courses offered at AFIT. Funds are centrally managed at the ACE Program Office at DSMC, and in order to assist them in determining course costs the program office has developed a cost model to estimate these bottom-line costs. The ACE model assesses all the training activities which consume resources on behalf of the ACE courses (16:37). The attributes of the course--number of students per course, number of times per year the course will be offered, delivery mode, costs associated with the different delivery modes, instructor requirements--are quantified and used to determine the bottom-line costs.

The model breaks each course's cost down into three components--Delivery Mode Cost, Instructor Training Cost, and Course Maintenance Cost. Each of these elements are divided further into sub-elements. Delivery Mode Cost is defined as the sum of the costs of the five possible modes of instruction--Resident, On-site, Contractor, Correspondence, and Satellite. Included in these different modes are the costs for the following: (1) student per diem and travel; (2) instructor per diem and travel; (3) contract instructor costs; and, (4) student O&M activities--paper, pencil, instructional media, instructional aids, books and pamphlets. Costs not included in the above, and therefore borne by the school, are: (1) faculty and staff salaries; (2) military construction costs; (3) custodial and building maintenance; and, (4) classroom furniture, furnishings and fixtures (1:ii).

Instructor Training Cost is defined as the number of instructors requiring training in order to conduct the course multiplied by the cost of training each instructor. Course Maintenance Cost is defined as the rate at which a course requires redevelopment multiplied by the cost of developing the course. For instance, if the rate was .10 this would mean that the cost of the maintenance required across 10 course offerings would be equal to the cost of developing the course the first time. Maintenance in this case can be defined as changes required in course content to keep it current. Because most acquisition courses require the most up-to-date information, frequent maintenance is required (16:42).

Constructing the model in this fashion "allows managers to judge the relative efficiency of each course through summary indices like cost per day, cost per student, and cost per student by delivery mode" (16:37). The determination of course costs also enables the ACE Program Office to request these funds in the annual Defense Budget and serves as a basis for distributing the funds once received.

Training Course Cost Report (TCCR). AFIT's parent organization is the Air University (AU) located at Maxwell AFB, Alabama. Annually, AU requires AFIT to submit a report detailing the costs associated with conducting the graduate schools, the Civilian Institution programs, and the PCE courses. The Training Course Cost Report (TCCR) is

submitted during the second quarter of every fiscal year by the Resource Management Directorate at AFIT and includes data from the previous fiscal year (3).

The TCCR consists of several sections pertinent to this research. The first of these is summary data on the courses actually taught. This includes the course title, course length, average grade of the student attending, number of times the course was taught during the year, total number of graduates, and the total "student weeks" for each course. The TCCR defines the student week as the total number of students who have attended courses multiplied by the length of the courses in weeks. This information is included for both resident courses (those courses offered at AFIT) and the on-site courses (those courses offered at the students' location) (3).

The TCCR also reports the number and grades of the personnel supporting the PCE program. These personnel fall into two categories: those that directly support the PCE program and those who indirectly support PCE. The School of Systems and Logistics (AFIT/LS) is the home of the PCE program and as such, directly supports the PCE activities. The organizations which indirectly support PCE are the command and support organizations who provide services for the entire AFIT community. Costs are generally grouped by materials, purchased services and other (3:23).

The TCCR also includes costs for base support activities outside of AFIT, categorized as base operating

support (BOS). A portion of these costs are allocated to AFIT based on the percentage of total base population assigned to AFIT.

Private-Sector Models. There have been numerous financial models developed to assist educational administrators in the private sector. These models are primarily simulation oriented, allowing the user to manipulate thousands of variables to represent different scenarios and assessing the resource implications in terms of staff, physical facilities, and finances (15:24).

One such model was developed by the Canadian Commercial Corporation for use in colleges and universities. Comprehensive Analytical Methods for Planning in University Systems (CAMPUS) includes parameters for computing instructional workloads, teaching staff requirements, teaching space requirements, supportive resource requirements, and forecasts enrollment (15:28). CAMPUS also includes a program costing model which calculates both direct and indirect costs for each course within varying programs. It also indicates the costs per student, per student contact hour, and per student credit hour. The authors cite CAMPUS's flexible nature for its wide-spread implementation in colleges and universities.

A similar model was developed by the National Center for Higher Education Management Systems. The Resource Requirements Prediction Model (RRPM) is a "long-range planning model designed to enable higher level management to

determine the resource implications of alternative policy and planning changes" (12:32). Among other functions, the RRPM system calculates the cost per credit hour categorized by discipline and course level. These costs are differentiated between direct and allocated costs and can be expressed in terms of cost per student for each of these categories of cost.

Summary

Unit costing requires both the identification of specific units of production and the collection of the costs associated with that production in order to be accurate and useful. The DBOF policy recognizes these requirements in establishing the criteria for a business area to be included under DBOF. The Air University draft implementation plan delays the use of full costing as dictated under DBOF until some point in time when the costs and the products can be reasonably determined.

Several education and training models have been developed both within the DoD and the private sector. None of these models, however, addresses the costs of education and training within the framework established by DBOF. The remainder of this research will focus on the development of a model tailored to these guidelines set forth by DBOF, and which will be capable of calculating a unit cost for courses offered through the PCE program.

III. Methodology

With the current movement by DoD toward the use of unit costing as a baseline for budgeting and for measuring value, it is clear that AFIT must develop some model for unit cost resourcing. The steps identified in Chapter 2 by Blandin and Melese are consistent with the guidance provided in the DBOF Implementation Plan and the Unit Cost Resourcing Guidance, and as such, provides an appropriate methodology for the development of a unit cost model. Again these steps are: 1) identify outputs; 2) identify inputs; 3) identify alternative combinations of inputs; 4) calculate the cost of each input; 5) calculate the total cost of all outputs; and, 6) calculate cost per unit output (7:2-3).

As it applies to the PCE environment, the only inconsistency with Blandin and Melese's methodology is in their third step, identifying alternative combinations of inputs. Blandin and Melese assume full control over the inputs used for production. They recognize that some inputs may be fixed, but state that others are fully flexible (7:3-4). Given the rigid bureaucratic structure of the DoD environment, nearly all of AFIT's inputs are fixed in the short-run. While AFIT may have control over a few of its inputs in the short-run, most are not flexible, including the hiring and firing of faculty and staff. Therefore, identifying alternative combinations of inputs is not a relevant alternative for this thesis.

Because the remainder of the framework set forth by Blandin and Melese is consistent with the principles of DBOF, the methodology used for this research effort parallels those steps. The remainder of this chapter discusses this methodology, and in general follows the following outline:

1) Identify the outputs.
2) Identify the inputs.
3) Determine the costs of the inputs.
4) Calculate the total cost.
5) Calculate the unit cost.

Step 1: Identify the Outputs

The UCRG states that outputs should reflect the primary mission of an organization and are best determined by answering the question, "What is the main product or service provided by the organization?" (8:5). On the surface, the answer to this question is simple--instruction of courses is the main service provided by the PCE program. The measurement of this output is more difficult. To assist in fully understanding the operations of the PCE program, personal interviews with administrators and instructors of the PCE program were conducted to determine how courses are planned and offered. Periodic reports detailing costs and workload were reviewed to analyze existing measures of output.

One document particularly useful was the Training Course Cost Report (TCCR) discussed in detail in Chapter 2. The TCCR contains a summary of all the courses taught in the

prior fiscal year. Included in the summary are the lengths of these courses, the number of graduates, and the number of times the course was taught. The TCCR uses the concept of a "student week" as the basis for measuring output. A student week is defined as 5 days of class work for one student. Therefore, one student attending a 3-week course (15 teaching days) generates 3 student weeks of instruction. Similarly, 3 students attending a 1-week course (5 teaching days) also generate 3 student weeks. The total output for the PCE program for the fiscal year would be the sum of the student weeks from each course taught.

There are alternative measures of output that could be considered. The number of students taught and the number of courses taught can both be used to measure the amount of instruction provided. When using the number of students as the measure, however, there is no differentiation made between 20 students who attend a 1-week class and 20 students who attend a 6-week class. Clearly there is more instruction involved in teaching the 6-week class than for the 1-week class. Using the number of courses taught as a measure of instruction presents the same problem. Teaching ten 3-week courses certainly involves more instruction than ten 1-week courses. This difference is not recognized by using courses as the measure.

The student week is not without criticism. As defined, the student week does not differentiate between a 1-week course attended by 30 students (which equates to 30 student

weeks) and a 3-week course attended by 10 students (which also equates to 30 student weeks). It is likely that the costs associated with these two scenarios would be different. For example, the student week does not take into consideration the varying levels of experience of the instructors. Using student weeks as the measure, a course taught by a full professor would cost the same amount as the same course taught by an associate professor. This difference, however, is inherent in most educational environments. Universities and colleges base tuition on quarter or semester hours and with few exceptions this tuition rate is constant regardless of the complexity of the course offered or the number of students enrolled in the course. This is a way of bringing all courses to a common baseline, namely the number of hours a student spends in class each week.

The PCE program does not use quarter or semester hours, but the amount of time that a student spends in class can be measured by the length of the course. Consequently, the use of the student week in the TCCR brings the amount of instruction in courses to a common baseline and has the effect of smoothing out or averaging any variances in course costs. Using the number of students taught or the number of courses taught as the measure of instruction ignores the difference in the amount of instruction provided in courses of different lengths. Therefore, the measure of output to be used in this model will be the student week.

Now that teaching courses has been established as the primary output of the PCE program and student weeks as the most appropriate measure of that output, the different methods of teaching courses need to be examined and their impacts understood. There are several different methods by which PCE courses are offered. These methods are classified into two groups, Resident and On-Site Programs, and Non Resident Operations (4).

Included in the Non Resident Operations are Seminar Programs, Correspondence Programs and Contracted Courses. Seminars are conducted through the students' education office by a facilitator who has demonstrated expertise in the particular area of interest. This expertise is shown through both professional and academic experience, and the facilitator must be approved by AFIT. There is no direct teaching involvement on the part of AFIT, and as such, the Seminar Program will not be considered.

The Correspondence Program offers the student the opportunity to obtain course credit through independent study. The student receives course materials through the Extension Course Institute (ECI) and must pass an equivalency exam before credit is granted (4). The equivalency exam is also supplied by ECI and administered locally by the student's base education office. Again, because ECI is a separate organization from AFIT, and there is no direct AFIT teaching required for the correspondence program, it will not be included in the model.

The third element of the Non Resident Operations are Contracted Courses. Often times there is more demand for a PCE course than AFIT can provide. In these circumstances, AFIT contracts an outside instructor to travel to the student's location to offer the course. The cost of contracting for these instructors will be included in the unit cost development.

The second and more predominant group of courses consists of resident courses, which require students to travel to AFIT for course instruction, and on-site courses, which require the faculty to travel to the students' locations. Both resident and on-site courses require direct involvement, or inputs, from AFIT. These inputs vary depending on whether the class being taught is a resident course or on-site course. For instance, on-site courses require faculty to travel to the site, while there is no such input for resident courses. The next section details these required inputs for the PCE program.

Step 2: Identify the Inputs

The TCCR groups the AFIT inputs necessary to conduct the PCE program into four distinct categories: personnel, materials, purchased services, and other. The breakout of these categories can be found in Appendix D. Generally speaking, "personnel" refers to the labor required to conduct courses; "materials" refers to the supplies needed; "purchased services" refers to the contracted services

necessary to conduct classes; and "other" refers to any inputs not captured under the first three categories. The TCCR draws much of its detail from the element of expense investment codes (EEICs) found in the standard operations & maintenance (O&M) accounting--3400 appropriation. Military personnel expenditures are drawn from the 3500 appropriation. Details of the types of inputs included under each category are discussed below.

There are also inputs to the PCE program that are provided by the customer, primarily the student and his/her incidental supplies. Since the supplies the student brings are not supplied by AFIT, they should not be included in measuring AFIT's inputs into the PCE program.

Personnel/Labor. Courses taught within the PCE program are taught by different instructors. There is a mix of military and civilian instructors, junior and senior instructors, staff and contract instructors. The labor for any one course taught at any one particular offering is the labor of the instructor(s) actually teaching the course. It follows, therefore, that total direct labor for one course is the total number of hours spent teaching that course. The total direct labor for teaching all PCE courses would be the sum of the direct labor for each course.

Using the methodology above with the more than 60 courses in the PCE program and the more than 300 course offerings, the task of tracking actual direct labor by course offering would be monumental. Not only would this

require a detailed tracking system, but it would raise some important issues: What constitutes actual teaching time? Should time spent with students outside the classroom be included in teaching time? Is there more labor involved in teaching courses with a large number of students than in teaching courses with relatively few students? What about course preparation time or time spent on course development? Because there is no system in place at AFIT to track either time actually spent in the classroom or time spent assisting students, there is no easy measure of the labor required to teach any particular course or set of courses.

In order to develop a meaningful measure of this labor required to "produce" a student week, i.e. the total amount of time one instructor spends toward the teaching of one student, we must examine the tasks involved in teaching PCE courses. Generally speaking, in order to offer any particular course it must first be developed (fully researched, outlined, documented, lesson plans developed, and test(s) prepared). Prior to actually teaching the course, an instructor must review the lesson plan and ensure he/she is prepared to teach. More time is spent prior to each class period reviewing material and ensuring all preparations are complete. Obviously, time is also spent teaching in the classroom. Additional time is set aside to meet with individual students and address any problems or questions they might have. Time is required to grade tests, homework, and projects. And finally, time is required to periodically update courses (redevelopment).

All the above tasks can be tied either directly or indirectly to the labor input of offering PCE courses. Only the time spent on class preparation, classroom instruction, helping individual students, and grading will be considered direct labor. Time spent on course development, course redevelopment, and administrative activities will be considered indirect labor. Every PCE course uses some amount of labor for every task above. The available data, however, does not indicate the portion of time spent on indirect vs direct activities.

One possible method to approximate the proportion of time spent on indirect vs direct activities would be to determine the number of weeks each instructor spends actually teaching PCE courses. The ratio of the number of weeks spent teaching versus the number of manweeks available in the year would serve as the basis for measuring direct labor. The ratio of the remaining weeks against the number of weeks in a year would serve as the basis for measuring indirect labor.

Unfortunately, in the planning stage there is no accurate system in place to measure the number of weeks instructors are scheduled to spend teaching. This is because planned course offerings are deliberately inflated in order to provide customers more flexibility in scheduling attendance. Many of the course offerings are dropped after it has become apparent that there is not sufficient demand. From an evaluation point of view, the number of weeks actually taught is measurable.

Whether instructor time is spent on direct or indirect activities, all of the labor supplied by PCE instructors to teach PCE courses is connected to the production of student weeks. Therefore, all of the costs for that labor will be charged to customers regardless of its categorization as either direct or indirect. In other words, 100 percent of the labor is accounted for and allocated to the student weeks. The measure of labor for an average student week, therefore, would be:

$$\frac{\text{Total Labor}}{\text{Total Student Weeks per FY}}$$

The calculation of an average amount of labor for an average student week makes the overall calculations easier. There is no need to differentiate between instructors, difficulty of course work, or actual teaching time vs preparation time. All instructor time is tied to course work.

Many would argue that the above argument is over simplified. Not all of an instructor's time is spent on just the tasks listed above. Instructors also spend time performing research and consulting with outside organizations. The research generally results in published articles and papers presented at various conferences. The consultations help other organizations resolve practical problems in an instructor's field of expertise. In this context, the papers and the consultations would be considered other outputs of the AFIT PCE program, and the

costs of performing research and consults should be excluded from the model. Again, however, there is no accounting system in place to separately track the amount of instructor time spent on research and consulting, and therefore these costs are lumped together with other AFIT costs. The costs incurred due to the consultation are offset somewhat by the fact that nearly all consultations are performed on the condition that all costs incurred be reimbursed to AFIT. These costs include travel, per diem, and other incidentals, but do not include the instructor's time.

There is an alternative point of view concerning whether it would be appropriate to eliminate costs associated with research and consulting even if it were possible. The primary goals of any institute of higher learning can be classified as a three step process: 1) the gathering of existing knowledge; 2) the creation of new knowledge, and 3) the dispensing of that knowledge. The gathering of existing knowledge is inherent in the research process. So, too, is the creation of new knowledge. Both must be accomplished to some degree prior to the dispensing of knowledge. A consultation involves a combination of research, practical application of existing knowledge, and the creation of new knowledge. The knowledge gathered from consultations frequently serves as the basis for the dispensing of knowledge.

In this context, instructor time spent on research and consultations can be tied directly to an instructor's role

as teacher. Research has to be conducted in order to stay current and in order to advance the field. Consultations serve as the basis for the practical application of what must be taught. Without both, AFIT would not be able to provide fully qualified instructors to teach in the PCE program.

Regardless of which point of view you prefer, the fact remains that PCE instructors are hired primarily to teach PCE courses. If there were no PCE courses, there would be no instructors performing research and consulting functions. On this basis, and considering the limitations of the accounting system, the unit cost model developed in this thesis will accept the premise that all time spent by an instructor is tied in some way to the production of a student week.

Materials. The TCCR groups day-to-day supplies, non-investment equipment, and software under the category of materials. Day-to-day supplies include paper, pens, chalk, paper clips, staples, and any other consumable resource necessary to conduct courses. Non-investment equipment also includes non-consumable items with an initial cost of less than $15,000 (8:6). Such items include personal computers, desks, chairs, tables, thermofax machines, and other similar items.

It could be argued that each course uses a different amount of supplies and equipment. The average course, however, uses an average amount of supplies and non-

investment equipment. Following the same logic as presented for personnel, the average student week uses an average amount of materials:

$$\frac{\text{Total Materials}}{\text{Total Student Weeks}}$$

Purchased Services. Purchased services includes such items as equipment maintenance, custodial services, and miscellaneous service contracts. It also includes instructors' textbooks, magazine subscriptions, incentive awards, and postal services. Like materials and personnel, purchased services can be expressed as an average:

$$\frac{\text{Total Purchased Services}}{\text{Total Student Weeks}}$$

Other. The category called "other" includes those items not captured under the above three categories. This consists primarily of faculty TDY for conferences and on-site courses. Average input of "other" is:

$$\frac{\text{Total Other}}{\text{Total Student Weeks}}$$

Capital Assets. An input category not captured in the TCCR is one that includes the capital assets necessary to provide courses. The TCCR only includes expenditures for normal operations and maintenance (3400 appropriation). Expenditures for investment equipment are under appropriation 3080; capital assets are under the military construction appropriation, 3300. Historical records for buildings and structures are kept at base civil engineering.

The UCRG (8:13) includes buildings, structures and facilities, leasehold improvements, major equipment, and ADP hardware and software as capital assets. Equipment items and ADP items must have a procurement cost in excess of $15,000 to be considered capital assets (8:6). Those items costing less are captured under materials.

Inputs for capital assets are measured in terms of straight-line depreciation (8:12). Annual depreciation for each capital asset would be calculated using straight-line depreciation techniques and the useful life table as presented in the UCRG (8:13-14). The total annual depreciation would be the sum of the annual depreciation for each item. The average input for capital assets would be:

$$\frac{\text{Total Annual Depreciation}}{\text{Total Student Weeks}}$$

Step 3: Collection of Costs of Inputs

The unit cost model in this thesis is intended to be used as both a planning and an evaluation tool. Therefore, cost projections are needed prior to each fiscal year (for planning) and actual costs are needed at the end of each fiscal year (for evaluation). The AFIT Financial Plan, or budget, contains projected costs for all AFIT programs including the PCE program. The TCCR provides a means of collecting the end of year costs for the PCE program. The costs of the inputs identified in the previous section, with the exception of capital assets, are contained within these

two sources. Capital asset costs can be extracted from budget documents detailing investment equipment expenditures. The remainder of this section will address specific issues dealing with extracting the costs of the five major inputs from both the TCCR and the financial plan.

Personnel/Labor. The PCE labor costs were not explicitly listed in either the TCCR or the AFIT Financial Plan. The TCCR contains labor costs for three different areas pertinent to the PCE program--AFIT/LS, AFIT Command Section, and the base support operations. (The workload for AFIT/LS includes instruction of both graduate courses and PCE courses.) As stated in the UCRG guidelines, PCE should be allocated a portion of these labor costs based on manpower assigned as a percentage of the total population (8:15-16). This was accomplished for the three organizations above and totaled to calculate the labor cost for the PCE program for one fiscal year.

Obtaining planned personnel costs is somewhat more involved. There are no planning dollars within the Financial Plan for each organization's personnel costs. However, if each section were to budget for the next year's personnel costs, it would simply involve taking the number of personnel assigned during the planning phase (generally during the Feb-Mar time frame), subtracting those projected losses, adding projected gains, and then multiplying each planned person by his/her annual wages. The UCRG states that a composite pay rate should be used to determine

planned military personnel costs (8:15). This composite rate includes, "basic pay, retirement accrual, allowances, special pay, incentive pay, and permanent change of station (PCS) travel" (8:15). To determine planning labor costs for civilians a similar rate is used which also contains factors for annual wages and other entitlements.

Materials. Cost for materials used exclusively for the PCE program are not currently itemized in the TCCR. Instead, similar to the situation for the personnel costs, material costs are captured under AFIT/LS, AFIT command section, and base support. Ideally, the cost of materials would be determined by adding the cost of materials used by each department directly for the PCE program or in support of the PCE program. Unfortunately, this detail has not been retained in the AFIT Financial Plan and is not ascertainable from the accounting system.

The UCRG recognizes that different techniques exist for the allocation of expenditures to different programs. It also states that additional research is required before definitive guidance can be developed (8:16). In the interim, the UCRG requires the allocation of expenditures based upon the percentage of personnel assigned (8:15-16). Using this methodology, material cost for the PCE program from AFIT/LS will be allocated based upon the ratio of PCE instructors assigned to AFIT/LS and the total number of instructors assigned to AFIT/LS. Material costs incurred by the AFIT command section for the PCE program will be based

upon the ratio of PCE instructors to the total number of instructors assigned to AFIT. Material cost from base support agencies will follow the same method as that for the AFIT command section.

Purchased Services and Other. Similar to the above categories, costs for purchased services and "other" are distributed to AFIT/LS, the AFIT command section, and base support agencies. The itemization of those costs that apply specifically to the PCE program is not currently possible. Therefore, the same allocation techniques applied to materials will be used.

Capital Assets. The UCRG calls for the depreciation of capital assets on a straight-line basis (8:11-12). Specifically, the total acquisition and installation costs minus the expected salvage value of the asset divided by the useful life of the asset yields the annual depreciation of the asset. The UCRG, however, only allows depreciation to be calculated for investment assets purchased or built after October 1990 (8:12). We recognize that this does not allow our model to reflect the complete cost of providing the PCE program. This policy, however, keeps AFIT from being penalized for capital investment decisions made prior to the use of common business practices. Some of these investments, while seeming reasonable, may not have been prudent when considered as business investments.

Step 4: Calculation of Total Cost

The total annual cost incurred by AFIT to provide the PCE program is the sum of the costs of the inputs above. Direct costs include those costs from AFIT/LS that are specifically for the instruction of PCE classes. General & Administrative expenses consist of allocation of costs from AFIT command section, base support agencies, and some overhead cost from the School of Systems and Logistics.

Step 5: Calculation of Unit Cost

The unit cost of producing a student week is calculated by taking the total annual cost from above and dividing by the total annual number of student weeks. For planning purposes, this is the total planned cost divided by the projected number of student weeks to be provided. For evaluation purposes, this is the total actual cost divided by the actual number of student weeks.

Summary

The overall methodology for development of unit cost for the PCE program relies on steps outlined by Blandin and Melese and DoD guidance for the application of these steps to the DoD environment. The output of the PCE program is the student week. The inputs are personnel, materials, purchased services, "other," and capital assets. Costs for these inputs can be found within the TCCR, the AFIT Financial Plan, and budget reports.

The itemization of the costs of inputs specifically for the PCE program is not always possible. Where costs for the PCE program are grouped with costs for other programs some calculation or allocation of those costs is necessary. The guidance provided by the UCRG serves as the basis for such allocation. The allocation method required by the UCRG is not necessarily the most appropriate. This will be discussed in more detail in the following chapter.

IV. Data Analysis

Introduction

Based upon the outline issued in the Unit Cost Resourcing Guidance and the discussion in Chapter 3, a working unit cost model can be presented. Such a model requires costs from each of the three functions providing input into the PCE program: AFIT/LS, AFIT Command Sections, and Base Operating Support (BOS) from the base. These costs should, in turn, be arranged into the five input categories: Personnel, Purchased Services, Materials, Capital Assets, and Other. The costs from each of the three elements can be allocated according to the UCRG. The total of the allocation provides the total cost of the PCE program for the fiscal year. That total cost divided by the total number of student weeks provides the average cost per student week. Student week calculations are contained in Appendix B. Table 1, below, provides an outline for the working unit cost model.

This model is suitable for use in both the planning stages for upcoming fiscal years and the evaluation stages of past years. Before the model can be presented in a usable format, it must be analyzed in terms of the data available. The following sections analyze the model for FY 1991. FY 1991 was chosen because it was the most recent year with data available from both the Financial Planning process and the annual Training Course Cost Report. Appendices C and D contain the cost data for FY 90.

Table 1

Summary of Costs for FY XX

Organization	Personnel	Purchased Services	Materials	Capital Assets	Other	Total Costs	Percent Allocated	Costs Allocated To PCE
AFIT/LS								
Command Sctns								
BOS								
					Total PCE Costs			
					Total Student Weeks			
					Cost/Student Week			

Planned Cost Per Student Week

Table 2 summarizes the five categories of planned fiscal year 1991 costs for the three functions providing inputs into the PCE program. Recall that the planned costs of the five categories are totaled and allocated to the PCE program based on the percentage of planned assigned personnel. The allocated costs are then summed and divided by the total number of planned student weeks to arrive at the average cost per student week. The following section explains the table in more detail and examines the cost data used to generate the summary table.

Table 3 contains the cost data for each of the ten departments within the School of Systems and Logistics and for the Acquisition Enhancement (ACE) program. The projected personnel costs are provided for each department, but the costs for Purchased Services, Materials, and Other, are listed only at an aggregate level. This is directly related to the level of detail provided by the source of the planned cost data--the AFIT Financial Plan. Since the costs being allocated to the PCE program are a percentage of the total costs, this lack of detail does not present a problem. The total costs of the ten departments and ACE are represented in Table 2 as the costs associated with AFIT/LS. There were no planned costs for the depreciation of Capital Assets in fiscal year 1991 for AFIT/LS.

The allocation percentage shown in Table 2 is based on guidance issued in the UCRG. It states that costs not

Table 2

Summary of Planned Costs for FY 91
(91$ $K)

Organization	Personnel	Purchased Services	Materials	Capital Assets	Other	Total Costs	Percent Allocated	Costs Allocated To PCE
AFIT/LS	7,474.1	216.7	150.2	0.0	325.6	8,166.6	40.0	3,543.6
Command Sctn	5,509.1	241.8	582.1	278.5	463.9	7,075.4	11.1	960.2
BOS	159,780.0	42,543.0	43,952.0	52.0	23,244.0	269,571.0	0.4	1,636.4

Total Planned PCE Costs	6,140.2
Total Planned Student Weeks	22,427
Planned Cost/Student Week	$274

Table 3

Planned Costs for FY 91--AFIT/LS
(91$ $K)

Departments	Total Cost	P E R S O N N E L Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
LS--Dean's Office	738.1	175.6	0.0	123.5	79.4	34.0	0.0	325.6
LSG--Graduate Program	206.4	121.1	51.5	33.9	0.0	0.0	0.0	0.0
LSA--Acad Op & Spt	547.1	85.1	157.5	304.6	0.0	0.0	0.0	0.0
LSQ--Qnt Mgmt	1,187.2	796.1	38.8	352.3	0.0	0.0	0.0	0.0
LSR--Comm & Org Sci	334.6	121.1	103.0	110.6	0.0	0.0	0.0	0.0
LSM--Log Mgmt	2,083.8	1,626.3	0.0	457.5	0.0	0.0	0.0	0.0
LSC--Research Prgms	36.7	36.7	0.0	0.0	0.0	0.0	0.0	0.0
LSP--Contract Mgmt	660.0	242.9	0.0	417.1	0.0	0.0	0.0	0.0
LSL--Govt Contr Law	536.1	94.2	0.0	441.9	0.0	0.0	0.0	0.0
LSY--Sys Acq Mgmt	1,583.2	631.2	0.0	952.0	0.0	0.0	0.0	0.0
ACE	253.5	0.0	0.0	0.0	137.3	116.2	0.0	0.0
Total Costs	8,166.6	3,930.1	350.7	3,193.3	216.7	150.2	0.0	325.6

Allocation Calculation:

Total PCE Personnel	112		
Total AFIT/LS Population	280	Percent Assigned to PCE	40.0%

directly traceable to the unit of output "shall be allocated to the outputs of the function on the basis of personnel associated with (assigned) to the output of the unit cost function" (8:16). Because the AFIT Financial Plan does not identify budgeted costs directly to the operating unit, the costs in Table 2 will be allocated using the above methodology. Quite simply, the percentage of personnel assigned to the PCE function is a ratio of the number of PCE personnel to the entire population in AFIT/LS. As mentioned in Chapter 3, these planned personnel figures are derived from manpower documents available during the period of Financial Plan preparation, or in this case Feb-Mar 1991. This ratio is computed in Table 3 and used to allocate PCE's share of the costs in the top line of Table 2.

The next entry in Table 2 contains the costs from the AFIT Command Sections. The detail for this entry is provided in Table 4. This table lists all the departments and activities which support the entire AFIT mission. The projected costs from each of the activities are also listed, and unlike the case with AFIT/LS, all of the budgeted costs are directly traceable to a department or activity. The Fabrication shop and Comm/Computer Systems directorate were the only activities that budgeted for capital assets in fiscal year 1991.

The allocation method used for the costs in Table 4 is identical to the method used for the AFIT/LS costs. The budgeted costs of the AFIT Command Sections are G&A

Table 4

Planned Costs for FY 91--Command Sections
(91$ $K)

AFIT COMMAND/SUPPORT	Total Cost	P E R S O N N E L Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
Public Affairs	107.0	41.8	61.2	0.0	0.5	1.4	0.0	2.0
Det 2, 3810 MES	112.4	41.8	0.0	63.9	3.5	0.4	0.0	2.8
Resource Mgt	188.5	59.6	0.0	19.0	43.9	62.2	0.0	3.7
Financial Mgmt	19.0	0.0	0.0	19.0	0.0	0.0	0.0	0.0
Finance Branch	177.3	0.0	0.0	177.3	0.0	0.0	0.0	0.0
Cost Branch	69.8	32.0	16.6	21.2	0.0	0.0	0.0	0.0
Budget	87.9	0.0	0.0	87.9	0.0	0.0	0.0	0.0
Comm/Computer Sys	1,718.1	524.0	425.3	174.8	108.5	175.7	270.0	39.8
Suggestions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Personnel	228.8	50.4	90.0	73.2	1.7	11.5	0.0	2.0
RM Fabrictn Shop	306.3	0.0	0.0	297.8	0.0	0.0	8.5	0.0
Instructnl Media	16.1	0.0	0.0	16.1	0.0	0.0	0.0	0.0
Presentn Serv	161.7	0.0	82.4	43.0	11.5	18.8	0.0	6.1
Graphics	106.5	0.0	0.0	89.3	0.0	17.2	0.0	0.0
Command	374.3	101.9	0.0	66.4	2.5	121.0	0.0	82.5
Admissions	1,645.9	0.0	717.6	804.8	0.0	121.0	0.0	2.5
Edu Plans & Ops	260.1	152.7	26.8	12.4	40.5	0.0	0.0	27.8
ITMO	41.8	0.0	41.8	0.0	0.0	0.0	0.0	0.0
Distance Education	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Information Mgmt	166.1	0.0	120.5	0.0	0.0	20.0	0.0	25.6
Squadron Section	89.7	24.1	65.6	0.0	0.0	0.0	0.0	0.0
CERM & Quality	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Academic Library	774.9	0.0	0.0	704.8	21.2	32.9	0.0	16.0
Supply	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Facility Projects	176.5	0.0	161.9	0.0	8.0	0.0	0.0	6.6
Basewide Civ PCS	17.2	0.0	0.0	0.0	0.0	0.0	0.0	17.2
Communications	229.3	0.0	0.0	0.0	0.0	0.0	0.0	229.3
Transient AF Pers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AF Pers w/o Assgmnt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Costs	7,075.4	1,028.3	1,809.8	2,670.9	241.8	582.1	278.5	463.9

Allocation Calculation:

Total PCE Personnel	112		
Total AFIT Population	1008	Percent Assigned to PCE	11.1%

(overhead) and therefore, are allocated based on the percentage of personnel assigned. That is the total number assigned to PCE divided by the total number of people in AFIT.

The third entry from Table 2 contains the projected costs associated with Base Operating Support (BOS). The three organizations which provide BOS are: the 2750 Air Base Wing--the host organization of Wright-Patterson AFB, the Medical Center, and the Commissary. The costs of these functions are allocated based on the premise that because the faculty and staff supporting the PCE program consume BOS resources the PCE program should be allocated a percentage of the costs associated with providing those services. Table 5 provides the projected BOS costs.

Once again the allocation technique used is based on the number of personnel assigned. To obtain the percent assigned, the entire base population first needs to be calculated. This is the sum of the personnel assigned to the 2750 ABW, the Medical Center, the Commissary and other units assigned to Wright-Patterson including AFIT at the end of FY 1991. It would have been more consistent with the previous methodology used for calculating planned personnel numbers for AFIT had the BOS personnel numbers been calculated during the Financial Plan preparation (Feb-Mar time frame). This information was not available, but because the BOS allocation percentage is less than one-half percent, the difference would be insignificant. The total

Table 5

Planned Costs for FY 91--BOS
(91$ $K)

Organization	Total Cost	P E R S O N N E L Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
2750 ABW (Gen Spt)	176,254.0	15,600.0	26,000.0	63,700.0	29,293.0	20,945.0	52.0	20,664.0
Medical Center	90,030.0	26,100.0	17,600.0	8,000.0	12,749.0	23,006.0	0.0	2,575.0
Commissary	3,287.0	50.0	130.0	2,600.0	501.0	1.0	0.0	5.0
Total Costs	269,571.0	41,750.0	43,730.0	74,300.0	42,543.0	43,952.0	52.0	23,244.0

Allocation Calculation:

Total PCE Personnel	112		
Total Base Population	25,965	Percent Assigned to PCE	0.4%

base population as of the end of FY 1991 is shown at the bottom of Table 5. This number is then divided into the total number of personnel assigned to the PCE program to obtain the percentage of the BOS costs which should be allocated to PCE.

Actual Cost Per Student Week

Table 6 summarizes the actual costs for fiscal year 1991. As in the above section, costs are provided for the three functions which provide inputs into the PCE program: the School of Systems and Logistics (AFIT/LS), the AFIT command section, and Base Operating Support. The costs within each function are divided into five categories: personnel costs, purchased services, materials, capital assets, and other. Costs are then allocated to the PCE program based on the percentage of assigned personnel (8:16). The allocated costs are then summed and divided by the total number of student weeks to arrive at the cost per student week. The following section explains the table in more detail and examines the cost data which feeds into the summary table.

School of Systems and Logistics. Table 7 contains the actual cost data for the School of Systems and Logistics from FY 1991. The data is broken out by cost center or department. Within our model, allocation of these costs to the PCE program has been made according to the guidelines provided in the UCRG. Analysis of the data, however,

Table 6

Summary of Actual Costs for FY 91

(91$ $K)

Organization	Personnel	Purchased Services	Materials	Capital Assets	Other	Total Costs	Percent Allocated	Costs Allocated To PCE
AFIT/LS	8,231.5	458.2	334.5	0.0	652.3	9,676.4	40.0	3,870.6
Command Sctn	8,020.5	406.7	1,312.0	283.1	310.4	10,332.7	11.1	1,148.1
BOS	159,784.8	51,899.5	42,781.4	123.2	21,753.2	276,342.1	0.4	1,192.0

Total Actual PCE Costs	6,210.7
Total Actual Student Weeks	15,919
Actual Cost/Student Week	$390

Table 7

Actual Costs for FY 91--AFIT/LS

(91$ $K)

Departments	Total Cost	P E R S O N N E L Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
LS--Dean's Office	891.1	330.4	188.1	156.7	25.0	187.8	0.0	3.1
LSG--Graduate Program	94.3	0.0	0.0	35.8	53.0	0.0	0.0	5.5
Cont Edu Division	3,716.2	3,592.9	25.5	52.2	0.4	2.2	0.0	43.0
Cont Edu Div--Short Crs	7.8	0.0	0.0	0.0	0.1	0.0	0.0	7.7
LSA--Acad Op & Spt	357.9	0.0	0.0	312.4	12.0	8.4	0.0	25.0
LSQ--Qnt Mgmt	770.6	0.0	0.0	694.9	64.7	0.3	0.0	10.7
LSR--Comm & Org Sci	468.2	0.0	0.0	456.3	1.2	3.4	0.0	7.2
LSM--Log Mgmt	697.5	0.0	0.0	661.1	8.3	0.0	0.0	28.1
LSC--Research Prgms	151.3	0.0	0.0	0.0	1.0	0.0	0.0	150.3
LSP--Contract Mgmt	597.8	0.0	0.0	549.1	4.5	6.4	0.0	37.8
LSL--Govt Contr Law	423.7	0.0	0.0	383.5	0.2	0.0	0.0	40.0
LSY--Sys Acq Mgmt	816.3	0.0	0.0	792.6	4.5	0.0	0.0	19.2
ACE	683.7	0.0	0.0	0.0	283.2	125.9	0.0	274.6
Total Costs	9,676.4	3,923.3	213.6	4,094.6	458.2	334.5	0.0	652.3

Allocation Calculation:

Total PCE Personnel	112		
Total AFIT/LS Population	280	Percent Assigned to PCE	40.0%

indicates that this might not be the most appropriate allocation method. (It is important to note that Continuing Education is not included in the planning documents. Planned costs for this area are captured under the department responsible for teaching the course and are not separated between graduate courses and PCE courses.)

Costs included under Continuing Education Division, Continuing Education Short Course (On-site), and ACE are direct costs for the PCE program. The entire cost for these departments should be allocated to the PCE program. The data, however, is not entirely accurate. Almost the entire cost of AFIT/LS military personnel has been allocated to the Continuing Education Division; almost none of the civilian personnel costs has been. In fact, both military and civilian personnel teach PCE courses. This problem can be corrected by allocating the personnel costs based upon personnel assigned.

The costs included in the above three departments for purchased services, materials, and other are not necessarily the complete costs of these inputs for the PCE program. Six of the remaining 10 departments teach PCE courses--LSQ, LSR, LSM, LSP, LSL, AND LSY. The number of PCE courses taught varies by department. All of the purchased services under Continuing Education are costs incurred specifically for the PCE program. Some of the costs for purchased services listed under the six departments that teach PCE courses might be in support of PCE courses. It seems reasonable to

determine the cost allocation of purchased services from each department by applying the percentage of personnel assigned to teach PCE in each department. The resulting allocation would be different from that obtained by using the percentage of PCE instructors assigned to AFIT/LS.

There are no material costs reported for the Continuing Education Division. There are material costs reported for the ACE program. Material costs for the PCE program, except those that can be traced directly to the ACE program, are captured under the department of the instructor teaching the course. Because some PCE instructors teach both ACE and non-ACE courses, allocation from each department cannot be made based upon personnel assigned to teach PCE courses without first adding ACE data to the appropriate department. Breakout of actual ACE expenditures by department is available through the AFIT Budget Office.

The four remaining departments--LS, LSG, LSA, and LSC--do not teach any courses at all. LSG, Directorate of Graduate Programs, performs no service at all for the PCE program. Therefore, there should be no allocation to the PCE program of costs incurred by LSG. LSA, Academic Operations and Support, performs all of its services for the PCE program. One hundred percent of the costs incurred by LSA should be allocated to the PCE program. LS, Office of the Dean, and LSC, Research Programs, are true overhead accounts. There seems to be no problem with allocating costs from these programs to the PCE program based upon percentage of personnel as per UCRG guidance.

There were no capital assets purchased in FY 91 for the School of Systems and Logistics. The UCRG permits only those assets purchased after 1 Oct 1990 (FY 91) to be depreciated (8:12).

AFIT Command Sections. Table 6, line 2, contains the total costs and allocation from the AFIT Command Sections. Table 8 shows the detailed breakout of those costs.

Per UCRG guidance, support for the School of Systems and Logistics by the AFIT command sections is considered general and administrative support (8:8). As such, the UCRG requires cost allocations to be made on the basis of percent of personnel assigned (8:16). On the surface this seems a reasonable allocation for AFIT Command Section costs to the PCE program. However, not all the sections listed in Table 8 perform services for the PCE program in equal proportion to total workload. The RM Fabrication Shop and the Admissions Offices perform few services for the PCE program. On the other hand, the sections of Instructional Media, Presentation Services, and Distance Education perform most of their work for the PCE program. Each of the other sections provides a different percentage of work for the PCE program. Because the workload is different for each section, each section should have costs allocated using the percentage factor that most closely resembles true work for the PCE program. This, however, would not fit UCRG guidance.

Table 8

Actual Costs for FY 91--Command Sections
(91$ $K)

AFIT COMMAND/SUPPORT	Total Cost	PERSONNEL Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
Public Affairs	158.6	36.0	120.4	0.0	0.4	1.4	0.0	0.5
Det 2, 3810 MES	130.8	77.0	0.0	51.0	0.3	0.6	0.0	1.9
Resource Mgt	267.1	89.8	0.0	15.9	83.1	77.5	0.0	0.8
Financial Mgmt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finance Branch	159.3	0.0	0.0	156.3	0.0	0.0	0.0	3.0
Cost Branch	25.9	0.0	0.0	25.9	0.0	0.0	0.0	0.0
Budget	217.5	0.0	26.0	191.5	0.0	0.0	0.0	0.0
Comm/Computer Sys	2,489.4	849.5	864.0	232.8	23.6	245.0	274.4	0.0
Suggestions	30.2	0.0	0.0	0.0	1.7	0.0	0.0	28.6
Personnel	399.7	89.8	189.6	97.6	7.8	14.8	0.0	0.0
RM Fabrictn Shop	310.6	0.0	0.0	297.8	0.6	2.9	8.7	0.6
Instructnl Media	362.5	0.0	89.8	64.7	0.0	0.0	0.0	207.9
Presentn Serv	222.8	0.0	0.0	43.0	5.8	174.0	0.0	0.0
Graphics	227.4	0.0	0.0	165.5	33.9	24.9	0.0	3.1
Command	836.6	435.7	23.6	348.1	19.7	8.6	0.0	0.8
Admissions	1,399.2	203.1	496.6	635.3	52.1	12.1	0.0	0.2
Edu Plans & Ops	784.3	594.5	92.0	47.2	11.5	39.1	0.0	0.0
ITMO	3.2	0.0	0.0	0.0	0.0	0.0	0.0	3.2
Distance Education	66.5	0.0	0.0	0.0	0.0	66.5	0.0	0.0
Information Mgmt	490.0	60.4	390.9	11.3	22.5	4.8	0.0	0.0
Squadron Section	5.6	0.0	5.4	0.0	0.0	0.2	0.0	0.0
CERM & Quality	95.7	0.0	0.0	69.0	0.0	0.0	0.0	26.7
Academic Library	1,139.1	0.0	0.0	505.1	31.8	602.2	0.0	0.0
Supply	142.5	5.1	94.4	0.0	0.0	37.5	0.0	5.5
Facility Projects	130.7	0.0	16.2	0.0	111.9	0.0	0.0	2.7
Basewide Civ PCS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Communications	15.5	0.0	0.0	0.0	0.0	0.0	0.0	15.5
Transient AF Pers	212.6	143.8	68.8	0.0	0.0	0.0	0.0	0.0
AF Pers w/o Assgmnt	9.2	0.0	0.0	0.0	0.0	0.0	0.0	9.2
Total Costs	10,332.7	2,584.8	2,477.6	2,958.2	406.7	1,312.0	283.1	310.4

Allocation Calculation:

Total PCE Personnel	112		
Total AFIT Population	1008	Percent Assigned to PCE	11.1%

Base Operating Support. Table 6, line 3 contains actual cost data from the base operating support agencies. Table 9 on the following page provides the detailed breakout for BOS costs in FY 1991.

Problem Areas

The working unit cost model does provide a useful figure for unit costs. However, there are problems inherent in its use for both the planned and actual unit cost. The most obvious of these problems is the use of appropriate allocation methods. The UCRG calls for allocation of general & administrative costs in support of a program based upon percent of personnel assigned (8:16). The data on actual costs indicates that not all support agencies provide a level of support equal to that percentage. Some provide more; some provide less. The workload data necessary to calculate a more appropriate percentage of allocation by work center is not available at this time. This type of data is usually collected through in-depth manpower studies. Likewise, the data necessary to support allocation of costs during the planning stage has never been required.

The current accounting system does not support a breakout of direct costs for the PCE program. Current procedures group costs by department. Many departments teach both PCE and non-PCE courses. Subsequently, the costs for PCE are buried within the total department costs. This necessitates the treatment of those costs as indirect costs

Table 9

Actual Costs for FY 91--BOS
(91$ $K)

Organization	Total Cost	P E R S O N N E L Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
2750 ABW (Gen Spt)	188,504	15,597	26,065	63,646	44,466	18,763	123	19,844
Medical Center	84,521	26,078	17,596	7,996	6,930	24,018	0	1,903
Commissary	3,317	51	129	2,627	503	1	0	6
Total	276,342	41,727	43,789	74,269	51,900	42,781	123	21,753

Allocation Calculation:

Total PCE Personnel	112		
Total Base Population	25,965	Percent Assigned to PCE	0.4%

and general and administrative costs subject to the allocation procedures provided in the UCRG. If these costs were broken out there could be a more accurate accounting of PCE costs.

Another potential problem noted was the change in the number of planned student weeks versus the actual student weeks taught. Instructors are currently encouraged to plan for a maximum number of course offerings. The intention is to provide a wide range of flexibility for the customer to attend classes. Offerings that do not have a minimum level of projected attendance are subsequently dropped from the schedule. This causes an overestimation of student weeks and an underestimation of the cost per student week. If funding is ever based solely on the projected unit cost, the AFIT PCE program will be under funded. Only an accurate projection of planned student weeks will fix this problem.

Finally, the calculated unit cost is based upon the combined number of student weeks offered in both the resident and on-site programs. This raises an important issue: Should resident and on-site courses be charged the same amount? It can be argued that the average PCE course, regardless of the location at which it is held, bears some costs for personnel, purchased services, materials, and other inputs. The course materials should be the same, the time invested in course development, and the total class time should be the same. However, if the instructor and the students are not at AFIT, there should be no costs for base

operating support. No AFIT utilities are used; no AFIT facilities are used; none of the base support is required. Likewise, since no capital assets are utilized, there should be no depreciation expense for capital assets.

On the other hand, costs incurred by the AFIT command section and costs incurred by base operating support agencies in support of the PCE program are incurred primarily for the permanent party personnel assigned to the AFIT PCE program. These costs are incurred to help the member live and work at AFIT. The fact that he happens to be TDY for a week or two does not change those costs. In this respect, all charges for a resident and an on-site course would be equal.

Currently, on-site courses are taught as both a convenience to the customer and a TDY savings for the Air Force. In some instances it has been easier for a given customer organization to sponsor a course at a location central to the organization. The organization can guarantee more attendance by personnel needing training as opposed to filling only a few annual quotas. AFIT saves because it does not pay student travel costs. (Under current procedures AFIT pays all student travel.)

Under unit cost procedures, AFIT will not bear the cost of student TDY. Student TDY costs will be paid by the customer. Users, however, will also be required to pay some fee for each student sent to a PCE course regardless of the location of the course. Given a choice of sending students

to AFIT for a PCE course for a fee that includes a factor for BOS or sending a student to an on-site offering of the same course for a fee that does not include BOS (a lower overall cost), it is to be expected that organizations will opt for the lower cost on-site courses. The resulting reimbursements will not cover the actual cost of providing PCE courses. In other words, if on-site courses are not charged the same rate as resident courses, the demand for on-site courses will increase dramatically while the attendance at resident courses will drop. The PCE program will be under-funded.

Summary

The working unit cost model proposed in this thesis is not without its problems. Complete direct costs for the PCE program cannot be determined from available data. The accounting system does not support the breakout of direct and indirect costs. Allocation of costs prescribed in the Unit Cost Resourcing Guidance does not reflect the manner in which costs are actually incurred. Data are not currently available to substantiate more appropriate allocation procedures. Planned courses are overestimated resulting in an inflated projection of the number of student weeks to be provided and an underestimation of cost per student week.

With a proper understanding of the above problems, however, the proposed model can be very useful. It can provide a baseline for projecting costs. It can be used as

a means of comparing actual costs with planned costs. Perhaps most importantly, the model can be used as a mechanism to measure the changes made in moving toward a system capable of supporting the unit cost concept.

V. Conclusions and Recommendations

Unit cost as a tool for resource allocation and budgeting is currently being implemented in many DoD organizations and its use in the education and training environment may not be not far off. Along these lines, DoD has issued guidelines for implementing unit cost in the form of the Unit Cost Resourcing Guidance (UCRG). By its own admission, the UCRG is incomplete and in some areas, merely a stopgap: "This guidance is intended to establish a practical level of consistency and uniformity until such time as there is a standard system in place" (8:1). Chapters 3 and 4 of this thesis were devoted to developing a working unit cost model which met the guidelines set forth in the UCRG. This chapter addresses sections of the model which need refinement in terms of either additional research or added flexibility in adopting methodologies other than those prescribed in the UCRG.

The primary source of many of the confounds faced by this research can be attributed to the accounting system in place at AFIT. The UCRG requires costs to be categorized as direct, indirect or general and administrative (G&A). The current accounting structure, however, does not facilitate the identification of those costs associated with the PCE program, not to mention the proper categorization of those costs. This accounting limitation can be traced directly to the organizational structure of AFIT. AFIT/LS contains both

the graduate program as well as the PCE program, and as such, its costs contain elements associated with both programs. This mix of costs from both the PCE and graduate education programs forces arbitrary decisions to be made regarding the further identification of these costs.

A similar problem exists in the planning data for the model. Recalling that the data for the planning stage of the model comes from the AFIT Financial Plan, this data is available only at an aggregate level. Instead of requesting funds for each individual department within AFIT/LS, funds are requested in the financial plan for the entire school and then issued to the departments. In order to determine the planning figure for the school, however, each department does submit budgets of their own which could be used to allocate the financial plan figures back to the departments. Even if the planning dollars were to be allocated back to the individual departments, the problem discussed in the above paragraph still exists, namely identifying how much of each departments' activities are supporting the PCE program.

The model's effectiveness in calculating the true cost of a student week is directly dependent on the accuracy of the data which it uses. Some of the cost problems have been discussed above, but another accuracy problem exists with the planned student weeks data. As discussed in Chapter 4, there is a large discrepancy in planned student weeks versus actual. This difference (in the case presented planned exceeded actual) will affect the planned cost/student week:

cost/student week will be understated if the planned student weeks are greater than actual; the cost/student week will be overstated if planned is less than actual. The instability of the planned student weeks can only hinder the ability of the planner in establishing a course cost, as shown in our model.

The UCRG prescribes only one method for allocating costs: "Costs incurred within a unit cost function shall be allocated to the outputs of the function on the basis of personnel associated with (assigned) to the output" (8:16). Often times, however, this is not the most appropriate method of allocation, and when used can under or overstate a department's share of costs.

Given the problems identified above, several recommendations are in order. In order to more accurately portray the true costs of operating the PCE program, the accounting system which tracks these costs needs to separately account for the PCE costs. Additionally, the accounting system should be capable of classifying these costs as direct, indirect or G&A. This second recommendation is not a necessary condition, but would facilitate a much more expedient process and enable a more accurate portrayal of the PCE costs.

A possible substitute for the above recommendation would be to reorganize the School of Systems and Logistics into two schools--one which would serve the graduate program and the other the PCE program. By doing so, costs

identified to either school would be solely chargeable to that particular school and would alleviate the burden of attempting to identify which costs belong to which program. This would certainly require additions to the current accounting structure, but would preclude a major overhaul to the basic system which would be necessary if the current organizational structure remained. (It should be noted at this point that AFIT/LS is currently assessing the feasibility of reorganizing into two schools. The graduate program and all its support functions would form the School of Logistics and Acquisition Management (AFIT/LA), and the PCE program would remain in the School of Systems and Logistics (AFIT/LS).)

Until such time that either the organizational structure is more clearly defined in terms of which departments are supporting which programs, or a more rigorous accounting system is adopted, it is unlikely that costs will be able to be identified to the level necessary to adequately support unit cost.

Another advantage of reorganizing into two schools would be the benefit of having the planning data clearly identified just as the actual costs would be. The PCE program would provide direct input into the AFIT Financial Plan and these budgeted dollars would serve as the basis for the planning phase of the model.

The discrepancy between planned and actual student weeks would not be resolved by reorganizing, but could be

addressed by analyzing the difference in the planned versus actual student weeks. If this difference can be shown to be constant over a number of years, this difference can be incorporated into the model. If no consistent variation can be determined, research needs to be done to determine a more accurate method for projecting true customer demand for the PCE program.

Finally, the allocation methods set forth in the UCRG are not necessarily appropriate for the conditions at AFIT. One possible alternative for allocating costs is to base the allocation on an approximation of the department's activities toward the output. For instance, if it was determined that only 20 percent of the Department of Quantitative Management's activities were in support of the PCE program, then it may be assumed that 20 percent of the costs incurred by the department should be charged to the PCE program. Determining the appropriate allocation percentage is often a task in itself, but can generate a more accurate picture of the costs which should be charged to the departments.

Until such time that the UCRG incorporates a more flexible approach to allocation techniques, AFIT will be forced to follow the current methodology. Further research needs to be conducted to determine appropriate methods for the allocation of overhead costs. Specifically, this research needs to focus on the allocation of base operating

support costs to AFIT, allocation of AFIT overhead to LS, and the allocation of LS overhead to the PCE program.

If the above recommendations are carried out, AFIT can successfully move the PCE program to a unit cost basis. Until such time, however, the best use of this model is as a gauge for measuring progress toward implementation of the unit cost concept.

Appendix A: Categorization of EEICs

EEICs and Descriptions

Purchased Services

582	Contract Data Processing Services
592XX	Miscellaneous Contract Services

Materials

605	Supply, System Spt Div
609	Supply, General Spt Div
619	Other Supply, Non-AFSF
627	Equip ADPE, General Spt Div
628	Equip. Gen Spt Div
637	ADPE Equip, Non-AFSF
639	Other Equip, Non-AFSF

Other

40XXX	TDY Costs (Excluding 40X5X, Student TDY Costs)
421	PCS Civilian
434	Rental of Vehicles
463	Transportation, Commercial
469	Other Transportation Charges
473	Equipment Rental
501	Printing & Reproduction

Appendix B: Student Week Calculations

Planned Resident Courses FY 91

Course	Title	Length in Weeks	Length in Days	Starts	Proj Grads	Class Days	Student Weeks
LOG 032	Reliability Cent Maint	1	5	5	110	550	110
LOG 092	Sr Trans Exec Dev Pgm	2	10	2	24	240	48
LOG 131	Industrial Maint Mgmt	3	15	6	144	2160	432
LOG 199	Intro to Logistics	2	10	6	150	1500	300
LOG 220	AFLC Materiel Mgt	1.8/3	9/15	6	144	1872	374.4
LOG 221	Log Mgr & Computer Sim	1	5	4	99	495	99
LOG 224	Logistics Mgmt	2	10	1	25	250	50
LOG 260	Provisioning Mgmt	2/2.6	10/13	4	96	1176	235.2
LOG 262	Applied Maint Mgmt	2	10	6	144	1440	288
LOG 290	AFLC Combat Anal Capab	2	10	5	100	1000	200
LO 299	Combat Logistics	2.4	12	4	96	1152	230.4
LO 399	Strategic Log Mgt	2	10	4	84	840	168
LOG 499	Log Executive Develop	1	5	2	32	160	32
PPM 057	* Contract Executive	1	5	12	240	1200	240
PPM 151	* Indust Property Admin	3	15	5	175	2625	525
PPM 153	* Production Management	6	30	5	125	3750	750
PPM 300	* Advanced Property Admin	2	10	5	100	1000	200
PPM 302	* Govt Contract Law	2	10	24	719	7190	1438
PPM 304	* Adv Contract Admin	2	10	15	375	3750	750
PPM 305	* Production Management II	2	10	10	240	2400	480
PPM 306	Contract Aspect Value Eng	1	5	6	150	750	150
QMT 020	R & M Overview	0.6	3	1	24	72	14.4
QMT 082	Qual & Prod Imp Team	1	5	2	48	240	48
QMT 084	Quality Mgt	0.8	4	7	168	672	134.4
QMT 089	Adv Proc Ctl Meth	1	5	3	72	360	72
QMT 090	Stat Process Ctl Meth	1	5	2	40	200	40
QMT 170	* Prin of Contr Pricing	3	15	12	288	4320	864
QMT 175	Prin of Cost Analysis	2	10	8	168	1680	336
QMT 180	Cost Imprmt Curve Analysis	1	5	5	120	600	120
QMT 335	R & M Design in Sys Acq	2	10	5	120	1200	240
QMT 345	* Quant Tech Cost Price Analysis	2.8	14	11	264	3696	739.2
QMT 353	Intro Life Cycle Costing	2	10	6	144	1440	288
QMT 355	Contract Ovhd Monitor	2	10	5	120	1200	240
QMT 372	Reliability	3	15	4	95	1425	285
QMT 540	* Adv Contract Pricing	2	10	3	72	720	144
QMT 550	Adv Quan Meth Cost Analy	3	15	3	60	900	180
QMT 551	Adv Cost & Econ Analysis	3	15	2	40	600	120
QMT 578	R & M Research & Applic	3	15	1	24	360	72
SYS 100	Intro Acquisition Mgmt	1	5	2	50	250	50
SYS 150	Engineering Data Mgmt	2	10	3	120	1200	240
SYS 200	Acquisition Plan & Analy	3	15	7	350	5250	1050
SYS 212	Man Crit Comp Sftw Mgmt	2	10	2	50	500	100
SYS 225	Acquisition Logistics	2	10	7	315	3150	630
SYS 227	Fin Mgt Weapon Sys Acq	2	10	6	140	1400	280
SYS 228	Applied Config Mgmt	1.8	9	5	90	810	162
SYS 229	Test & Evaluation Mgmt	1.6	8	3	72	576	115.2
SYS 230	AF TO Acquisition & Mgmt	2	10	3	135	1350	270
SYS 361	Surveillance of C/SCSC	2	10	2	60	600	120
SYS 362	Cost Sched Contr Sys Crit	3	15	4	120	1800	360
SYS 363	Basic Analy Perf Meas Data	1	5	2	80	400	80
SYS 370	Defense Data Management	1.8	9	6	162	1458	291.6
SYS 400	Intermediate Pgm Mgmt	2	10	6	144	1440	288
Totals for FY 91 Planned Resident Courses					7127	75369	15073.8

Planned On-Site Courses FY 91

Course	Title	Length in Weeks	Length in Days	Start	Proj Grads	Class Days	Student Weeks
LOG 032	Reliability Cent Maint	1	5	1	22	110	22
LOG 260	Provisioning Mgmt	2	10	2	48	480	96
LOG 262	Applied Maint Mgmt	2	10	3	72	720	144
LOG 299	Combat Logistics	2.4	12	6	144	1728	345.6
PPM 300	* Adv Property Admin	2	10	2	40	400	80
PPM 302	* Govt Contract Law	2	10	45	1350	13500	2700
PPM 304	* Adv Contract Admin	2	10	17	425	4250	850
PPM 306	Contract Aspect Value Eng	1	5	5	125	625	125
QMT 020	R & M Overview	0.6	3	4	96	288	57.6
QMT 082	Qual & Prod Imp Team	1	5	1	24	120	24
QMT 084	Improv Qual & Product	0.8	4	4	96	384	76.8
QMT 088	Adv Qual Cir Meth	0.6	3	1	24	72	14.4
QMT 170	* Prin of Contr Pricing	3	15	23	630	9450	1890
QMT 180	Cost Imprmt Curve Analysis	1	5	3	72	360	72
QMT 345	* Quan Tech Cst-Pric	3	15	5	120	1800	360
QMT 353	Intro Life Cycle Cost	2	10	1	24	240	48
QMT 355	Contract Ovhd Monitor	2	10	3	72	720	144
QMT 372	Reliability	3	15	1	24	360	72
QMT 550	Adv Quan Meth Cost Analy	3	15	1	20	300	60
SYS 225	Acquistion Logistics	2	10	1	30	300	60
SYS 230	AF Tech Ord Acq & Mgt	2	10	1	20	200	40
SYS 370	Defense Data Management	1.8	9	1	40	360	72
Totals for FY 91 Planned On-Site Courses					3518	36767	7353.4

Actual Resident Courses FY 91

Course	Title	Length in Weeks	Length in Days	Starts	Grads	Class Days	Student Weeks
LOG 032	Reliability Cent Maint	1	5	4	73	365	73
LOG 092	Sr Trans Exec Dev Pgm	2	10	1	14	140	28
LOG 131	Industrial Maint Mgmt	3	15	3	66	990	198
LOG 199	Intro to Logistics	2	10	2	200	2000	400
LOG 220	AFLC Materiel Mgt	3	15	1	18	270	54
LOG 221	Log Mgr & Computer Sim	1	5	1	24	120	24
LOG 224	Logistics Mgmt	3	15	1	18	270	54
LOG 260	Provisioning Mgmt	2.6	13	4	84	1092	218.4
LOG 262	Applied Maint Mgmt	2	10	5	93	930	186
LOG 290	AFLC Combat Anal Capab	2	10	5	81	810	162
LOG 299	Combat Logistics	2.4	12	4	92	1104	220.8
LOG 399	Strategic Logis Mgmt	2	10	4	82	820	164
LOG 499	Log Exec Developmt Crse	1.4	7	1	21	147	29.4
PPM 057	* Contract Executive	1	5	12	226	1130	226
PPM 151	* Indust Property Admin	3	15	5	119	1785	357
PPM 153	* Production Management	6	30	3	49	1470	294
PPM 300	* Advanced Property Adm	2	10	2	35	350	70
PPM 304	* Advanced Contract Adm	2	10	15	337	3370	674
PPM 305	* Production Management	3	15	10	204	3060	612
PPM 355	Contract Ovhd Monitorsh	2	10	3	66	660	132
PPM 306	Contract Aspect Value E	1	5	5	125	625	125
PPM 302	* Government Contract L	2	10	23	668	6680	1336
QMT 020	R & M Overview	0.6	3	1	16	48	9.6
QMT 082	Qual & Prod Imp Team Pr	1	5	4	86	430	86
QMT 084	Quality Management	0.8	4	7	126	504	100.8
QMT 089	Adv Process Control Met	1	5	3	31	155	31
QMT 090	Statictical Process Con	1	5	3	64	320	64
QMT 170	Princ of Contr Pricing	3	15	12	264	3960	792
QMT 175	* Princ of Cost Analysi	2	10	6	102	1020	204
QMT 180	Cost Imprmt Curve Analy	1	5	5	80	400	80
QMT 335	R & M Design in Sys Acq	2	10	4	61	610	122
QMT 345	* Quant Tech Cost Price	2.8	14	11	200	2800	560
QMT 353	Intro Life Cycle Costin	2	10	5	103	1030	206
QMT 372	Reliability	3	15	3	46	690	138
QMT 540	* Adv Contract Pricing	2	10	2	38	380	76
QMT 550	Adv Quan Meth Cost Anal	3	15	2	32	480	96
QMT 551	Adv Cost & Econ Analysi	4	20	1	15	300	60
QMT 578	R & M Research & Applic	3	15	1	16	240	48
SYS 100	Intro Acquisition Mgmt	1	5	2	52	260	52
SYS 150	Engineering Data Mgmt	2	10	2	57	570	114
SYS 200	Acquisition Plan & Anal	3	15	7	364	5460	1092
SYS 212	Msn Crit Sftwr Spt Mgt	2	10	1	25	250	50
SYS 225	Acquisition Logostics	2	10	7	286	2860	572
SYS 227	Fin Mgt Weapon Sys Acq	2	10	6	143	1430	286
SYS 228	Applied Config Mgmt	1.8	9	5	87	783	156.6
SYS 229	Test & Evaluation Mgmt	1.6	8	3	84	672	134.4
SYS 230	AF TO Acquisition & Mgm	2	10	2	76	760	152
SYS 361	Surveillance of C/SCSC	2	10	3	98	980	196
SYS 362	Cost Sched Contr Sys Cr	3	15	3	77	1155	231
SYS 363	Basic Analy Perf Meas D	1	5	2	61	305	61
SYS 370	Defense Data Management	1.8	9	5	118	1062	212.4
SYS 400	Intermediate Program Mg	2	10	6	150	1500	300
Totals for FY 91 Actual Resident Courses					5653	59602	11920

Actual On-Site Courses FY 91

Course	Title	Length in Weeks	Length in Days	Starts	Grads	Class Days	Student Weeks
LOG 032	Reliability Cent Maint	1	5	1	11	55	11
LOG 260	Provisioning Mgmt	2	10	2	48	480	96
LOG 262	Applied Maint Mgmt	2	10	1	31	310	62
LOG 299	Combat Logistics	2.4	12	2	52	624	124.8
PPM 300	Advanced Property Admin	2	10	2	38	380	76
PPM 304	Advanced Contract Admin	2	10	18	400	4000	800
PPM 305	Production Management I	3	15	1	19	285	57
PPM 355	Contract Ovhd Monitorsh	2	10	4	90	900	180
PPM 306	Contract Aspect Value E	1	5	6	159	795	159
PPM 302	Government Contract Law	1.8	9	7	207	1863	372.6
QMT 020	R & M Overview	0.6	3	4	109	327	65.4
QMT 082	Qual & Prod Imp Team Pr	1	5	4	103	515	103
QMT 084	Quality Management	0.8	4	7	150	600	120
QMT 170	Princ of Contr Pricing	3	15	9	181	2715	543
QMT 180	Cost Imprmt Curve Analy	1	5	5	94	470	94
QMT 345	Quant Tech Cost Price A	2.8	14	6	123	1722	344.4
QMT 353	Intro Life Cycle Costin	2	10	1	24	240	48
QMT 372	Reliability	3	15	1	22	330	66
QMT 550	Adv Quan Meth Cost Anal	3	15	1	19	285	57
SYS 100	Intro Acquisition Mgmt	1	5	1	31	155	31
SYS 150	Engineering Data Mgmt	2	10	1	40	400	80
SYS 227	Fin Mgt Weapon Sys Acq	2	10	1	23	230	46
SYS 229	Test & Evaluation Mgmt	1.6	8	1	27	216	43.2
SYS 230	AF TO Acquisition & Mgm	2	10	3	47	470	94
SYS 370	Defense Data Management	1.8	9	1	59	531	106.2
Totals for FY 91 Actual On-Site Courses					2107	18898	3779.6

Planned Resident Courses FY 90

Course	Title	Length in Week	Length in Days	Start	Proj Grads	Class Days	Studen Weeks
LOG 032	Reliability Cent Maint	1	5	4	88	440	88
LOG 092	Sr Trans Exec Dev Pgm	2	10	2	24	240	48
LOG 131	Industrial Maint Mgmt	3	15	6	144	2160	432
LOG 199	Intro to Logistics	2	10	6	150	1500	300
LOG 220	AFLC Materiel Mgt	1.8/3	9/15	6	144	2016	403.2
LOG 221	Log Mgr & Computer Sim	1	5	2	50	250	50
LOG 224	Logistics Mgmt	2/3	10/15	7	175	2500	500
LOG 260	Provisioning Mgmt	2/2.6	10/13	5	120	1488	297.6
LOG 262	Applied Maint Mgmt	2	10	6	146	1460	292
LOG 290	AFLC Combat Anal Capab	2	10	4	80	800	160
LOG 299	Combat Logistics	2.4	12	5	120	1440	288
PPM 057	* Contract Executive	1	5	14	210	1050	210
PPM 151	* Indust Property Admin	3	15	4	120	1800	360
PPM 153	* Production Management	6	30	3	78	2340	468
PPM 300	* Advanced Property Adm	2	10	5	110	1100	220
PPM 302	* Govt Contract Law	2	10	26	780	7800	1560
PPM 304	* Adv Contract Admin	2	10	15	375	3750	750
PPM 305	* Production Management	3	15	5	120	1800	360
PPM 306	Contract Aspect Value E	1	5	6	156	780	156
QMT 020	R & M Overview	0.6	3	2	48	144	28.8
QMT 082	Qual & Prod Imp Team	1	5	2	48	240	48
QMT 084	Improv Qual & Product	0.8	4	5	121	484	96.8
QMT 088	Adv Quality Circle	1	5	1	20	100	20
QMT 089	Alternative Prob-Solv	1	5	1	24	120	24
QMT 170	* Prin of Contr Pricing	3	15	11	266	3990	798
QMT 175	Prin of Cost Analysis	2	10	4	96	960	192
QMT 180	Cost Imprmt Curve Analy	1	5	8	192	960	192
QMT 335	R & M Design in Sys Acq	2	10	5	120	1200	240
QMT 345	* Quant Tech Cost Price	2.8	14	7	168	2352	470.4
QMT 353	Intro Life Cycle Costin	2	10	5	120	1200	240
QMT 355	Contract Ovhd Monitor	2	10	7	168	1680	336
QMT 372	Reliability	3	15	4	96	1440	288
QMT 540	* Adv Contract Pricing	2	10	2	48	480	96
QMT 550	Adv Quan Meth Cost Anal	3	15	3	72	1080	216
QMT 551	Adv Cost & Econ Analysi	4	20	1	18	360	72
QMT 578	R & M Research & Applic	3	15	2	48	720	144
SYS 100	Intro Acquisition Mgmt	1	5	2	50	250	50
SYS 150	Engineering Data Mgmt	2	10	3	75	750	150
SYS 200	Acquisition Plan & Anal	3	15	5	250	3750	750
SYS 212	Msn Crit Comp Sftw Mgmt	2	10	5	125	1250	250
SYS 225	Acquisition Logostics	2	10	7	315	3150	630
SYS 227	Fin Mgt Weapon Sys Acq	2	10	6	144	1440	288
SYS 228	Applied Config Mgmt	1.8	9	5	90	810	162
SYS 229	Test & Evaluation Mgmt	1.6	8	6	144	1152	230.4
SYS 230	AF TO Acquisition & Mgm	2	10	4	112	1120	224
SYS 361	Surveillance of C/SCSC	2	10	2	60	600	120
SYS 362	Cost Sched Contr Sys Cr	3	15	4	124	1860	372
SYS 363	Basic Analy Perf Meas D	1	5	2	80	400	80
SYS 370	Defense Data Management	1.8	9	5	125	1125	225
SYS 400	Intermediate Pgm Mgmt	2	10	9	216	2160	432
Totals for FY 90 Planned Resident Courses					6773	72041	14408

Planned On-Site Courses FY 90

Course	Title	Length in Weeks	Length in Days	Start	Proj Grads	Class Days	Student Weeks
LOG 032	Reliability Cent Maint	1	5	1	30	150	30
LOG 224	Logistics Mgt	2	10	1	30	300	60
LOG 260	Provisioning Mgmt	2	10	1	23	230	46
LOG 262	Applied Maint Mgmt	2	10	3	90	900	180
LOG 290	AFLC Combat Anal Capa	2	10	1	23	230	46
LOG 299	Combat Logistics	2	10	6	144	1440	288
PPM 151	* Indust Property Admin	2	10	1	30	300	60
PPM 153	* Production Management	6	30	2	52	1560	312
PPM 302	* Govt Contract Law	2	10	11	330	3300	660
PPM 304	* Adv Contract Admin	2	10	17	425	4250	850
PPM 306	Contract Aspect Value En	1	5	4	104	520	104
QMT 020	R & M Overview	0.6	3	3	90	270	54
QMT 084	Improv Qual & Product	1	5	4	96	480	96
QMT 170	* Prin of Contr Pricing	3	15	5	150	2250	450
QMT 175	Prin of Cost Analysis	2	10	1	30	300	60
QMT 180	Cost Imprmt Curve Analy	1	5	2	60	300	60
QMT 345	* Quan Tech Cst-Pric	2.8	14	2	24	336	67.2
QMT 355	Contract Ovhd Monitor	2	10	2	60	600	120
QMT 372	Reliability	3	15	2	60	900	180
QMT 540	Adv Contract Pricing	3	15	2	60	900	180
QMT 550	Adv Quan Meth Cost Analy	3	15	1	30	450	90
SYS 150	Engineering Data Mgmt	3	15	1	20	300	60
SYS 200	Acquisition Plan & An	3	15	2	100	1500	300
SYS 370	Defense Data Management	1.8	9	1	40	360	72
Totals for FY 90 Planned On-Site Courses					2101	22126	4425.2

Actual Resident Courses FY 90

Course	Title	Length in Week	Length in Days	Start	Grads	Class Days	Studen Weeks
LOG 032	Reliability Cent Main	1	5	4	79	395	79
LOG 092	Sr Trans Exec Dev Pgm	2	10	2	24	240	48
LOG 131	Industrial Maint Mgmt	3	15	6	137	2055	411
LOG 199	Intro to Logistics	2	10	6	157	1570	314
LOG 220	AFLC Materiel Mgt	3	15	3	58	870	174
LOG 221	Log Mgr & Computer Si	1	5	2	36	180	36
LOG 224	Logistics Mgmt	3	15	3	60	900	180
LOG 260	Provisioning Mgmt	2.6	13	5	107	1391	278.2
LOG 262	Applied Maint Mgmt	2	10	5	100	1000	200
LOG 290	AFLC Combat Anal Capa	2	10	3	51	510	102
LOG 299	Combat Logistics	2.4	12	5	109	1308	261.6
LOG 399	Strategic Logis Mgmt	2	10			0	0
LOG 499	Log Exec Developmt Cr	1.4	7			0	0
PPM 057	* Contract Executive	2	10	13	224	2240	448
PPM 151	* Indust Property Adm	3	15	4	127	1905	381
PPM 153	* Production Manageme	6	30	3	70	2100	420
PPM 300	* Advanced Property A	2	10	5	88	880	176
PPM 304	* Advanced Contract A	2	10	15	309	3090	618
PPM 305	* Production Manageme	2	10	5	118	1180	236
PPM 355	Contract Ovhd Monitor	2	10			0	0
PPM 306	Contract Aspect Value	1	5	6	137	685	137
PPM 302	* Government Contract	2	10	26	775	7750	1550
QMT 020	R & M Overview	0.6	3	2	47	141	28.2
QMT 082	Qual & Prod Imp Team	1	5	2	63	315	63
QMT 084	Quality Management	0.8	4	5	117	468	93.6
QMT 088	Quality Imprvmt Semin	1	5	1	17	85	17
QMT 089	Adv Process Control M	1	5	1	22	110	22
QMT 090	Statictical Process C	1	5			0	0
QMT 170	Princ of Contr Pricin	2.8	14	11	255	3570	714
QMT 175	* Princ of Cost Analy	2	10	3	67	670	134
QMT 180	Cost Imprmt Curve Ana	1	5	8	155	775	155
QMT 335	R & M Design in Sys A	2	10	5	107	1070	214
QMT 345	* Quant Tech Cost Pri	2.8	14	9	194	2716	543.2
QMT 353	Intro Life Cycle Cost	2	10	6	121	1210	242
QMT 355	Contract Ovhd Monitor	2	10	6	115	1150	230
QMT 372	Reliability	3	15	4	85	1275	255
QMT 540	* Adv Contract Pricin	2	10	2	37	370	74
QMT 550	Adv Quan Meth Cost An	3	15	3	56	840	168
QMT 551	Adv Cost & Econ Analy	3	15	1	10	150	30
QMT 578	R & M Research & Appl	3	15	2	38	570	114
SYS 100	Intro Acquisition Mgm	1	5	2	51	255	51
SYS 150	Engineering Data Mgmt	2	10	3	73	730	146
SYS 200	Acquisition Plan & An	3	15	4	202	3030	606
SYS 212	Msn Crit Sftwr Spt Mg	2	10	5	112	1120	224
SYS 225	Acquisition Logostics	2	10	7	315	3150	630
SYS 227	Fin Mgt Weapon Sys Ac	2	10	6	140	1400	280
SYS 228	Applied Config Mgmt	1.8	9	5	92	828	165.6
SYS 229	Test & Evaluation Mgm	1.6	8	7	215	1720	344
SYS 230	AF TO Acquisition & M	2	10	4	110	1100	220
SYS 361	Surveillance of C/SCSC	2	10	2	47	470	94
SYS 362	Cost Sched Contr Sys	3	15	4	118	1770	354
SYS 363	Basic Analy Perf Meas	2	10	2	69	690	138
SYS 370	Defense Data Manageme	1.8	9	5	121	1089	217.8
SYS 400	Intermediate Program	2	10	8	191	1910	382
Totals for FY 90 Actual Resident Courses					6128	64996	12999

Actual On-Site Courses FY 90

Course	Title	Length in Week	Length in Days	Offer	Grads	Class Days	Studen Weeks
LOG 032	Reliability Cent Main	1	5			0	0
LOG 260	Provisioning Mgmt	2.6	13	1	23	299	59.8
LOG 262	Applied Maint Mgmt	2	10	3	73	730	146
LOG 290	AFLC Combat Analysis	2	10	1	19	190	38
LOG 299	Combat Logistics	2.4	12	6	151	1812	362.4
PPM 151	Indust Prop Admin	2	10	1	32	320	64
PPM 153	Production Management	6	30	2	39	1170	234
PPM 300	Advanced Property Adm	2	10	1	22	220	44
PPM 304	Advanced Contract Adm	2	10	18	386	3860	772
PPM 305	Production Management	3	15			0	0
PPM 355	Contract Ovhd Monitor	2	10			0	0
PPM 306	Contract Aspect Value	1	5	6	153	765	153
PPM 302	Government Contract L	2	10	23	645	6450	1290
QMT 020	R & M Overview	0.6	3	5	150	450	90
QMT 082	Qual & Prod Imp Team	1	5	2	42	210	42
QMT 084	Quality Management	0.8	4	5	108	432	86.4
QMT 090	Alternative Problem S	1.6	8	2	35	280	56
QMT 170	Princ of Contr Pricin	2.8	14	14	353	4942	988.4
QMT 175	Princ of Cost Analysi	2	10	1	22	220	44
QMT 180	Cost Imprmt Curve Ana	1	5	3	64	320	64
QMT 345	Quant Tech Cost Price	2.8	14	2	40	560	112
QMT 353	Intro Life Cycle Cost	2	10			0	0
QMT 355	Contract Ovhd Mgmt	2	10	2	45	450	90
QMT 372	Reliability	3	15	2	38	570	114
QMT 540	Adv Contract Pricing	2	10	2	34	340	68
QMT 550	Adv Quan Meth Cost An	3	15	1	20	300	60
SYS 100	Intro Acquisition Mgm	1	5			0	0
SYS 150	Engineering Data Mgmt	2	10	1	23	230	46
SYS 200	Acquisition Plan & An	3	15	1	51	765	153
SYS 227	Fin Mgt Weapon Sys Ac	2	10			0	0
SYS 229	Test & Evaluation Mgm	1.6	8			0	0
SYS 230	AF TO Acquisition & M	2	10			0	0
SYS 370	Defense Data Manageme	1.8	9			0	0
Totals for FY 90 Actual On-site Courses					2568	25885	5177

Summary of Planned Costs for FY 90

(90$ $K)

Organization	Personnel	Purchased Services	Materials	Capital Assets	Other	Total Costs	Percent Allocated	Costs Allocated To PCE
AFIT/LS	6,725.8	335 3	906.3	N/A	1,263.4	9,230.8	30.7	2,835.8
Command Sctn	6,669.8	1,034.0	1,429.9	N/A	387.6	9,521.3	9.5	907.7
BOS	155,067.0	37,434.0	35,532.5	N/A	25,371.5	253,405.0	0.3	852.3
					Total Planned PCE Costs			4,595.8
					Total Planned Student Weeks			18,833
					Planned Cost/Student Week			$244

Planned Costs for FY 90--AFIT/LS

(90$ $K)

Departments	Total Cost	PERSONNEL Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
LS--Dean's Office	1,390.9	102.6	0.0	107.3	205.3	696.3	N/A	279.4
LSG--Graduate Program	187.7	102.6	49.3	35.8	0.0	0.0	N/A	0.0
LSA--Acad Op & Spt	554.7	110.2	185.7	258.7	0.0	0.0	N/A	0.0
LSQ--Qnt Mgmt	1,051.1	618.9	36.2	396.1	0.0	0.0	N/A	0.0
LSR--Comm & Org Sci	248.6	115.8	49.3	83.5	0.0	0.0	N/A	0.0
LSM--Log Mgmt	2,107.2	1,683.8	0.0	423.5	0.0	0.0	N/A	0.0
LSC--Research Prgms	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
LSP--Contract Mgmt	627.7	267.1	0.0	360.6	0.0	0.0	N/A	0.0
LSL--Govt Contr Law	387.4	88.3	0.0	299.2	0.0	0.0	N/A	0.0
LSY--Sys Acq Mgmt	1,351.5	649.6	0.0	701.9	0.0	0.0	N/A	0.0
ACE	1,324.0	0.0	0.0	0.0	130.0	210.0	N/A	984.0
Total Costs	9,230.8	3,738.8	320.5	2,666.5	335.3	906.3	N/A	1,263.4

Allocation Calculation:

Total PCE Personnel	98		
Total AFIT/LS Population	319	Percent Assigned to PCE	30.7%

Planned Costs for FY 90--Command Sections

(90$ $K)

AFIT COMMAND/SUPPORT	Total Cost	P E R S O N N E L Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
Public Affairs	233.8	60.8	144.9	0.0	0.5	25.1	N/A	2.5
Det 2, 3810 MES	6.0	0.0	0.0	0.0	4.0	0.5	N/A	1.5
Resource Mgt	434.9	88.3	0.0	18.3	193.9	129.8	N/A	4.6
Financial Mgmt	229.9	0.0	56.4	173.4	0.0	0.0	N/A	0.0
Finance Branch	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
Cost Branch	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
Budget	114.4	35.3	0.0	79.1	0.0	0.0	N/A	0.0
Comm/Computer Sys	2,572.7	729.3	654.2	114.1	291.1	707.9	N/A	76.1
Suggestions	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
Personnel	313.7	60.8	133.5	45.2	0.0	73.3	N/A	0.9
RM Fabrictn Shop	297.8	0.0	0.0	297.8	0.0	0.0	N/A	0.0
Instructnl Media	15.5	0.0	0.0	15.5	0.0	0.0	N/A	0.0
Presentn Serv	284.5	0.0	158.1	0.0	73.3	47.8	N/A	5.3
Graphics	83.4	0.0	0.0	83.4	0.0	0.0	N/A	0.0
Command	417.8	251.3	16.6	45.5	0.0	78.2	N/A	26.2
Admissions	2,099.8	0.0	1,222.5	773.9	1.2	78.2	N/A	24.0
Edu Plans & Ops	981.5	272.0	16.6	11.9	435.5	15.0	N/A	230.5
ITMO	47.9	0.0	47.9	0.0	0.0	0.0	N/A	0.0
Distance Education	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
Information Mgmt	140.8	0.0	120.8	0.0	9.0	11.0	N/A	0.0
Squadron Section	110.5	0.0	72.4	38.1	0.0	0.0	N/A	0.0
CERM & Quality	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
Academic Library	770.3	0.0	0.0	695.6	25.5	33.2	N/A	16.0
Supply	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
Facility Projects	175.7	0.0	25.9	110.2	0.0	39.6	N/A	0.0
Basewide Civ PCS	22.3	0.0	0.0	0.0	0.0	22.3	N/A	0.0
Communications	168.0	0.0	0.0	0.0	0.0	168.0	N/A	0.0
Transient AF Pers	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
AF Pers w/o Assgmnt	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
Total Costs	9,521.3	1,497.7	2,669.9	2,502.1	1,034.0	1,429.9	N/A	387.6

Allocation Calculation:

Total PCE Personnel	98		
Total AFIT Population	1028	Percent Assigned to PCE	9.5%

Planned Costs for FY 90--BOS

(90$ $K)

Organization	Total Cost	P E R S O N N E L Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
2750 ABW (Gen Spt)	150,951.0	3,800.0	20,700.0	61,450.0	24,948.0	17,219.0	N/A	22,834.0
Medical Center	99,139.0	35,500.0	22,800.0	8,010.0	11,986.0	18,311.0	N/A	2,532.0
Commissary	3,315.0	57.0	250.0	2,500.0	500.0	2.5	N/A	5.5
Total Costs	253,405.0	39,357.0	43,750.0	71,960.0	37,434.0	35,532.5	N/A	25,371.5

Allocation Calculation:

Total PCE Personnel	98		
Total Base Population	29,137	Percent Assigned to PCE	0.3%

Summary of Actual Costs for FY 90
(90$ $K)

Organization	Personnel	Purchased Services	Materials	Capital Assets	Other	Total Costs	Percent Allocated	Costs Allocated To PCE
AFIT/LS	8,359.7	198.9	254.8	N/A	464.9	9,278.3	30.7	2,850.4
Command Sctn	7,649.5	653.6	766.0	N/A	209.4	9,278.5	9.5	884.5
BOS	155,159.3	46,013.3	23,297.3	N/A	23,856.8	248,326.7	0.3	835.2

Total Actual PCE Costs	4,570.2
Total Actual Student Weeks	17,146
Actual Cost/Student Week	$267

Actual Costs for FY 90--AFIT/LS
(90$ $K)

Departments	Total Cost	P E R S O N N E L Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
LS--Dean's Office	4,753.5	4,053.5	309.9	145.1	0.0	245.0	N/A	0.0
LSG--Graduate Program	86.5	0.0	0.0	25.0	52.7	0.3	N/A	8.5
Cont Edu Division	125.1	0.0	0.0	23.6	1.1	0.0	N/A	100.4
Cont Edu Div--Short Crs	0.9	0.0	0.0	0.0	0.0	0.0	N/A	0.9
LSA--Acad Op & Spt	296.5	0.0	0.0	292.1	4.4	0.0	N/A	0.0
LSQ--Qnt Mgmt	678.1	0.0	0.0	660.6	6.8	0.0	N/A	10.6
LSR--Comm & Org Sci	487.3	0.0	0.0	468.7	5.3	0.6	N/A	12.7
LSM--Log Mgmt	685.4	0.0	0.0	641.5	8.9	7.2	N/A	27.7
LSC--Research Prgms	15.3	0.0	0.0	0.0	5.6	0.0	N/A	9.7
LSP--Contract Mgmt	561.0	0.0	0.0	528.6	7.8	1.4	N/A	23.2
LSL--Gov't Contr Law	583.7	0.0	0.0	459.9	99.7	0.3	N/A	23.9
LSY--Sys Acq Mgmt	786.2	0.0	0.0	751.1	6.4	0.0	N/A	28.6
ACE	218.9	0.0	0.0	0.0	0.0	0.0	N/A	218.9
Total Costs	9,278.3	4,053.5	309.9	3,996.3	198.9	254.8	N/A	464.9

Allocation Calculation:

Total PCE Personnel	98		
Total AFIT/LS Personnel	319	Percent Assigned to PCE	30.7%

Actual Costs for FY 90--Command Sections
(90$ $K)

AFIT COMMAND/SUPPORT	Total Cost	P E R S O N N E L Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
Public Affairs	162.3	56.2	101.0	0.0	0.0	2.2	N/A	2.9
Det 2, 3810 MES	107.2	63.8	0.0	41.8	0.0	0.3	N/A	1.3
Resource Mgt	334.8	89.2	0.0	96.7	106.4	41.3	N/A	1.3
Financial Mgmt	10.3	0.0	0.0	10.3	0.0	0.0	N/A	0.0
Finance Branch	164.9	0.0	0.0	164.9	0.0	0.0	N/A	0.0
Cost Branch	25.3	0.0	0.0	24.8	0.0	0.0	N/A	0.5
Budget	110.0	0.0	6.5	101.9	0.1	0.0	N/A	1.5
Comm/Computer Systems	2,108.2	991.1	815.6	218.8	29.8	34.3	N/A	18.5
Suggestions	7.8	0.0	0.0	0.0	7.8	0.0	N/A	0.0
Personnel	597.4	89.2	172.6	104.4	224.1	5.4	N/A	1.7
RM Fabrication Shop	277.7	0.0	0.0	275.3	0.0	2.4	N/A	0.0
Instructional Media	69.5	0.0	0.0	61.1	7.0	1.4	N/A	0.0
Presentation Services	199.1	0.0	81.4	40.5	13.7	62.0	N/A	1.4
Graphics	184.7	0.0	0.0	157.5	21.4	5.8	N/A	0.0
Command	722.7	295.9	0.0	326.1	73.6	2.7	N/A	24.5
Admissions	1,419.7	241.6	498.7	613.2	43.7	17.6	N/A	5.0
Edu Plans & Operations	632.0	484.3	73.8	45.0	13.1	11.9	N/A	4.0
ITMO	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
Distance Education	5.7	0.0	0.0	0.0	0.9	0.0	N/A	4.8
Information Mgmt	466.9	61.3	346.3	40.3	6.9	6.3	N/A	5.9
Squadron Section	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
CERM & Quality	113.3	0.0	0.0	78.4	22.2	0.0	N/A	12.7
Academic Library	1,038.1	0.0	0.0	507.3	43.2	486.1	N/A	1.5
Supply	247.2	51.0	109.7	0.0	0.0	86.4	N/A	0.0
Facility Projects	46.3	0.0	0.0	0.0	39.7	0.0	N/A	6.5
Basewide Civ PCS	17.4	0.0	0.0	0.0	0.0	0.0	N/A	17.4
Communications	98.0	0.0	0.0	0.0	0.0	0.0	N/A	98.0
Transient AF Personnel	0.0	0.0	0.0	0.0	0.0	0.0	N/A	0.0
AF Pers w/o Duty Asgmt	112.0	45.8	66.2	0.0	0.0	0.0	N/A	0.0
Total Costs	9,278.5	2,469.4	2,271.8	2,908.3	653.6	766.0	0.0	209.4

Allocation Calculation:

Total PCE Personnel	98		
Total AFIT Population	1,028	Percent Assigned to PCE	9.5%

Actual Costs for FY 90--BOS
(90$ $K)

Organization	Total Cost	PERSONNEL Officer	Enlisted	Civilian	Purchased Services	Materials	Capital Assets	Other
2750 ABW (Gen Spt)	163,659.2	3,818.5	20,758.4	61,450.1	39,379.1	15,995.8	N/A	22,257.3
Medical Center	81,288.1	35,513.7	22,784.8	8,013.3	6,084.1	7,298.4	N/A	1,593.9
Commissary	3,379.4	57.4	250.6	2,512.5	550.2	3.1	N/A	5.6
Total	248,326.7	39,389.6	43,793.8	71,975.8	46,013.3	23,297.3	N/A	23,856.8

Allocation Calculation:

Total PCE Personnel	98		
Total Base Population	29,137	Percent Assigned to PCE	0.3%

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Vita

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Vita

Captain Jeffrey K. Young was born on 27 February 1966 in Syracuse, New York. He graduated from Anderson High School in Cincinnati, Ohio in 1984 and attended Purdue University, where he was a distinguished graduate and earned a Bachelor of Science in Mathematics in May 1988. While at Purdue he was selected to attend Airborne training at Fort Benning, Georgia and earned his parachutist wings in August 1987. Upon graduation, he received a regular commission in the USAF and began his military career at Kelly AFB, Texas. He served as an acquisition budget officer with the San Antonio Air Logistics Center where he managed over $1 billion in support funds for the Initial Aircraft Spares and Ground Support Equipment programs. He remained at Kelly AFB until entering the School of Systems and Logistics, Air Force Institute of Technology, in May 1991.

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13. ABSTRACT *(Maximum 200 words)*

This research focused on the development of a unit cost model for the Professional Continuing Education (PCE) program within the Air Force Institute of Technology's School of Systems and Logistics. The methodology employed follows that issued in the Unit Cost Resourcing Guidance developed by DoD and was limited to utilizing the accounting structure already in place.

This model can be used primarily at the beginning of each planning cycle to determine the rate to charge customers for courses provided in the coming fiscal year. This model could also be used at the end of the fiscal year to compare the actual cost of providing courses with the planned cost.

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